THE IRON TRADE REVIEW

VOLUME XXVIII. CLEVELAND, O. MARCH 21, 1895. CHICAGO, ILL. NUMBER 12.

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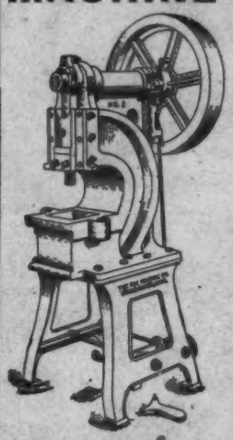

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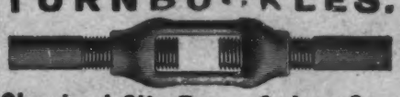

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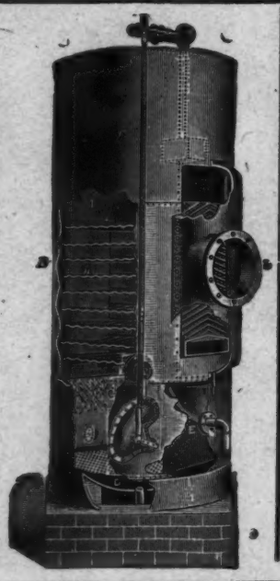

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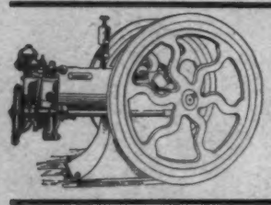

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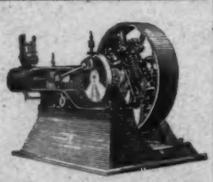

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THE IRON TRADE REVIEW

VOLUME XXVIII. CLEVELAND, O. MARCH 21, 1895. CHICAGO, ILL. NUMBER 12.

THE WEEK IN IRON CIRCLES.

THE MARKET AT LARGE.

The important events of the week to the iron trade have been the announcement of an advance in coke-workers' wages, with a prompt strengthening of the market for Bessemer pig, and the beginning of negotiations that in all probability will result in sales of Lake Superior ores before the close of the month. No announcement of coke prices has been made as yet, but the fact that in a few cases April coke was contracted for a short time ago on the basis of two cents advance over existing prices for every cent advance in mining leads to the belief that the advance will be very close to 25 cents. Some operators, however, have been asking a three to one ratio in providing against a wage advance. This would mean an additional 35 cents on a ton of coke. Furnacemen have covered in part on sales of Bessemer pig for delivery after April 1 by accumulating coke at the low prices prevailing, and at most valley furnaces, moreover, there are goodly stocks of Bessemer iron. The advance in coke will not work hardship, therefore, unless there remain some low-priced sales by brokers that are yet uncovered. The question of ore prices comes up next and it is likely that the beginning of another month will give the producers of Bessemer pig a very definite idea of the cost of their mixture on the new basis for fuel and ore. The Bessemer pig iron market responded promptly to the annonncement concerning coke. Eastern buyers who had failed to do business on offers of $9 50 at valley furnace, the week previous, and held off expecting the market to come to their figure, bought 3,000 tons at $9.75 in the valley, or $10.40 Pittsburg, and early in the present week this price was refused by furnaces. Under present conditions little is to be looked for in actual transactions, except for prompt delivery. On May and June deliveries valley furnacemen are asking $10 at furnace. Whether the stimulus that has been given to Bessemer iron will extend to other material is yet to be developed. In soft steel billets there has been little effort to do business by either side. Sellers have been strengthened in their unwillingness to consider recent low prices. Finished material for early delivery has been in only moderate demand, but there may be more readiness to place orders at present prices, in view of the advance that will come in raw material. It is well understood that the maintenance of an advance in Bessemer pig and in steel will depend on a well-sustained demand for mill products. The week has added little of importance in this direction. Wire rod, wire and wire nail mills are busy and sheet mills are well employed, with an expanding demand for black plates. Structural mills are accumulating a large tonnage for the second quarter of the year, Eastern work furnishing a good part of it. Reports from foundries are conflicting. So many of them depend upon week-to-week shipments from furnaces, that the latter are still accumulating stocks, in spite of the fact that they are well sold ahead.

THE CLEVELAND OUTLOOK.

Another week, it is expected, will bring interesting developments as to the market for Lake Superior Bessemer ores in 1895. Indications now are that the price basis will be established by actual transactions within that time—at all events that the attitude of the ore men will be clearly defined. There is a feeling on the part of certain furnace interests that the new coke basis and the new ore basis might well be known at one time, so that there may be no lingering uncertainty about the latter, to call for another adjustment after the fuel question is disposed of. Figuring conservatively, the cost of a Bessemer mixture is likely to be 40 cents greater per ton of pig iron after new ore and coke contracts are made. The increased cost may exceed this, since there is a considerable range of estimates concerning the new coke circular, and we have taken the lowest prices named in figuring as above.

Pig Iron. The week has brought a number of inquiries for Bessemer pig iron, some of them on Eastern account, but the situation does not assist in closing business. The uncertainty as to the size of the coke advance makes furnaces unwilling to sell for delivery in May and June without a distinct advance over the last of the heavy purchases of two or three weeks ago. Some valley firms have quoted $10 at furnace on May and June iron, making an allowance for higher ore and coke. Eastern offers of $9.60 were refused in the latter part of last week and some moderate buying was reported later at $9.75. This week an offer of $9.80, valley furnace, May deliveries was refused in Cleveland. It is believed, however, that prompt sales could be made at from $9.70 to $9 80 in the valley, equivalent to $10 35 to $10 45 Pittsburg. In the week, offers of coke at 95c for the balance of March have been made through brokers. What will come from the maneuvering for position by coke operators will appear in another week or two. Furnacemen have from two to four weeks' supply ahead, and shipments for the balance of March will be heavy. Whether those who are best stocked ahead on coke and have low-priced ores to last to June or July will give away this advantage is an important element in determining the future of the market. Foundry iron is moving from furnaces a trifle more freely, but prices are at the minimum. On No. 2 some valley producers still maintain $9.25 at furnace, but others cut this. Southern pipe iron has sold in the Cleveland district at a price that would require a concession from the open freight rate to net the furnace $6. Upwards of 10,000 tons was sold. In Western New York some inquiry has come up for pipe iron, but Southern furnaces were out of the race. Lake Superior charcoal iron shows spasmodic activity. Recent sales have materially shaded $12.50.

Finished Material. With the promise of weather for out-door work inquiry is better, for structural and railway material. Delays in shipments into this district indicate that the mills are full in certain departments. The iron mills of the valley are running irregularly and even the pendency of the scale question, with its chances of a shut-down, does not lead to any accumulation of stock. Prices on plates, beams, channels, angles and bars are unchanged.

THE CHICAGO OUTLOOK.

[SPECIALLY REPORTED FOR THE IRON TRADE REVIEW.]

The market continues in about the same condition in nearly every respect. Only a few orders of any magnitude were taken in the past week, but the aggregate of sales was good, being brought up by the large number of small orders, which have come in with encouraging frequency from widely separated points in the Chicago territory. Pig iron has not sold in large lots, but the total tonnage for the week is fully equal to that of the week previous, and the inquiry indicates a large tonnage for the near future. In finished iron and steel a fair business has been done, almost entirely in small orders.

PIG IRON.—The feeling of encouragement prevailing during the past two or three weeks is still very noticeable. Shipments are called for about as fast as the furnaces can furnish them, and they are being made at an increasing rate. Local iron had no single sale larger than 500 tons, but the number of small orders was larger than at any time for the past two months. There are several inquiries of large size in the market, one for 2000 tons and another for 3,000 tons. Prices on local iron are very firm. One furnace reports having secured orders at an advance of 25c. Southern iron was rather quiet last week, the total being considerably smaller than for the week before; but there are numerous inquiries in the market. Charges of cutting are made by some of the sellers, and it is certain that at least one furnace has made prices considerably under the market quotations. The market can hardly be called a strong one on this account; yet some furnaces say they will not lower prices under any consideration. Lake Superior charcoal has been rather quiet, and only a few small orders have been taken. Quotations are unchanged and are as follows:

Lake Sup. Charcoal	$13 00@13 50	Southern No. 2 Soft	$ 9 75@10 00
Local Coke Fdy. No. 1	10 25@10 50	South'n Silveries No. 1	11 50@11 75
Local Coke Fdy. No. 2	9 75@10 00	South'n Silveries No. 2	11 25@11 50
Local Coke Fdy. No. 3	9 40@ 9 65	Jackson Co. Silveries	15 00@16 00
Local Scotch Fdy. No. 1	10 25@10 50	Ohio Silveries No. 1	14 00@14 50
Local Scotch Fdy. No. 2	9 75@10 00	Ohio Silveries No. 2	13 00@13 50
Local Scotch Fdy. No. 3	9 50@ 9 75	Ohio Strong Softeners	12 50@13 00
South'n Coke No. 2	10 00@10 25	Alabama Car Wheel	17 50@18 00
South'n Coke No. 3	9 50@ 9 75	Malleable Bessemer	11 00@11 50
Southern No. 1 Soft	10 00@10 25	Coke Bessemer	11 00@11 50

BARS.—Sales fell off somewhat from the week before; a 400-ton order was the largest. Yet the outlook is encouraging, and it is probable that the present week will show a good tonnage closed. One inquiry has been received from a car works for the iron for 300 cars ordered by Armour the last of the week. Prices are very firm, and quotations range all the way from 1c to 1.10c for common iron. The former figure is made by some of the Western mills, while other mills in this territory quote 1.05c. Valley iron is selling from 1.05c to 1.10c. Guaranteed iron is quoted at 1.15c, and soft steel bars from strictly billet stock at 1.20c.

RAILS AND TRACK SUPPLIES.—Two or three orders of 2,000 or 3,000 tons were placed in the last week. None of the large orders that are expected to be placed have been given out yet. Quotations are maintained at $23 to $25 for rails; splice bars, 1.25c to 1.30c; track bolts, 1.95c to 2c; spikes, 1.65c to 1.70c.

BILLETS AND RODS.—There is no change in the market and no sales of either billets or rods are reported. The market is firm at the last quotations; billets, $16.50; and rods, $23 to $23.50.

STRUCTURAL MATERIAL.—There is no inquiry in the market for large lots, but general business is increasing rapidly and small orders are reaching a larger aggregate every week. Quotations are unchanged as follows: Beams and channels, 1.45c to 1.50c; angles, 1.30c to 1.35c; plates, 1.35c to 1.40c; tees, 1.65c to 1.70c. Small lots from stock are quoted at ¼c to ½c higher.

PLATES.—The call for plates is increasing all the time, and while no large orders have been placed as yet, there are several inquiries in the market for large quantities. General business is rather better, and orders were more frequent last week. Quotations are unchanged, as follows: Tank steel, 1.35c to 1.40c; flange steel, 1.50c to 1.75c; firebox steel, 2c to 5c; boiler tubes, 75 to 77½ per cent discount.

MERCHANT STEEL.—There is no improvement and orders are for small quantities. It is expected that implement makers will take rather more than their contracts call for, which will help business quite a little within the next few weeks. Prices are continued: Open-hearth spring, tire and machinery steel, 1.55c to 1.60c; smooth finished tire and machinery, 1.50c to 1.60c; Bessemer bars, 1.35c to 1.40c; tool steel, 5.50c to 7.50c; specials, 11c and upwards.

SHEETS.—The inquiry for black sheets is larger than of late, and some call has been made for deliveries during next fall. The manufacturers' agents have so far refused to make prices on such deliveries, however, deeming them too far ahead. Transient business is considerably better and deliveries are larger than they have been of late. Prices are made at 2.25c to 2.30c for No. 27 common iron. Steel sheets are sold at 2.35 to 2.40c. Galvanized sheets are in better demand and quite good sales were made during the last week. Quotations are unchanged at 80 per cent discount.

OLD RAILS AND WHEELS.—There has been considerable call for old rails, and one sale of 2,000 tons was made for delivery out of this territory, on a basis of $10.50 Chicago. A sale of 2,000 tons of old wheels was also made for delivery out of the city at a price equal to $8.75 Chicago. Old steel rails are in good demand, and inquiries for from 2,000 to 3,000 tons have been received. They are quoted at $6.50 to $7 for short lengths and from $8.50 to $9 for long lengths, Chicago.

SCRAP.—There is still a good demand for some classes of scrap, and it would appear that the consumption will be fully equal to the production for some time to come. Prices are unchanged as follows: Railroad forge, $8.50 to $9; dealer's forge, $7; No. 1 mill, $6.50; No. 1 machinery, $7; axles, $12 to $12.25; cast borings, $3.50; wrought turnings, $5.25; axle turnings, $6.25; mixed steel, $5; heavy cast, $7 to $7.25; stove plates, $5 to $5.25; heavy melting steel, $7 to $7.50.

IN OTHER MARKETS.

[SPECIALLY REPORTED FOR THE IRON TRADE REVIEW.]

Pittsburg. The uppermost topic in this market the past week has been the advance in the wages of coke-workers, beginning with those in the employ of the Frick Coke Co., the new rate starting April 1. The effect of this action has been visible already in the market for Bessemer pig and there is much speculation as to the course of the market in the immediate future. The advance announced by the Frick Co. is from 78 cents to 90 cents per 100 bushels, for mining; for drawing, 50 cents will be paid, instead of 43. W. J. Rainey has announced that a similar scale will go into effect at his works at once. Several smaller companies have fallen into line with an announcement of an advance April 1. No circular of prices has been issued as yet, but it is expected that April coke will be bought for $1.15 to $1.25; no intimation is given yet as to the basis on contracts for the remainder of the first half of the year. The heavy production of coke recently has been in evident preparation for an advance. Furnace firms have been taking large shipments. For

the week ending March 9, the total was 8,860 cars, an increase of 58 cars over the preceding week, and production was estimated at 159,025 tons in the same week, also an increase. Bessemer pig has advanced in the week under the stimulus of the increase in coke that will come April 1. Eastern buyers have been in the market, and have offered $9.50 and $9.60, valley furnace, for May and June deliveries, but furnacemen have been unwilling to sell. A transaction is reported at $9.75, valley furnace, for Eastern shipment. Early in the present week buyers were offering $10.40, Pittsburg, for April and May iron, but such offers were refused. Furnacemen in the valleys are reported to be holding for $10 at furnace. Meantime little is being done. It is claimed that with the coke advance and the ore advance that is expected to become a fact by April 1, the basis named will but little more than make even to the furnaces the increased cost of their metal. In steel billets there has been little business. The feeling is better, in sympathy with the advance in Bessemer pig but there are few buyers in the market. Quotations are still made at $14.75@$14 90. In muck bar a sale is reported of 1,000 tons at $17.75 delivered at Pittsburg mill. The order was taken at this unprecedented price merely to give employment to puddlers. Structural material has shown a steady run of orders and the outlook is continually improving. Plates have been in fair demand in small lots. A city contract for open-hearth plates involving a considerable tonnage brought out some low bids. Sheet mills are busy. Black plates have been in good demand at 2.20c@2.25c. Wire rod mills are busy and the output is being taken as fast as made. We quote the market a $21.50. Old material, particularly steel melting stock, has shown considerable activity. Old iron rails have also sold well, at $12.50.

Cincinnati. There is considerable encouragement in the volume of business going, but the demand is not yet sufficient to have a noticeable effect upon prices. In both Northern and Southern irons, the transactions noted are at the minimum figures. The best thing that can be said is that there is a well recognized bottom to prices—as some irresponsible agents have found out to their cost, in risking orders below authority given. A number of such orders have been unfeelingly turned down by the furnaces interested. We have already spoken of a number of large transactions in Southern coke irons recently closed. The aggregate for two weeks is certainly not less than 50,000 tons booked by three companies, and will probably run to 60,000. Besides this, the every-day demand from the rank and file of foundries and mills is better than it has been for months. But for the conservative spirit which characterizes the iron trade, all the way through, it is likely that the heavy current business would be deemed a warrant for putting up prices a little. Nothing short of an earthquake, it would seem, can startle consumers of iron into any condition of alarm about an ample supply at bed-rock prices.

Buffalo. There has been a decided increase in the volume of business, and while it is still far from being what is desired, there is reason for encouragement in the improvement and the better tone. Prices have not responded in the least to the better demand, and transactions have been chiefly in the cheaper grades which go into heavy work.

St. Louis. The past week has seen a great irregularity in trade. Some foundries are running full time, behind on orders and urging quick shipment of iron, while others have closed down or are running on stock without any special, immediate demand. One consumer sees nothing encouraging ahead, while the other thinks the tide has certainly changed for the better. In general, trade is satisfactory, and a steady market at about present prices can reasonably be expected.

PERSONAL.

A local paper says that President Leander Raney and Treasurer Geo. B. Berger, of the Raney & Berger Iron Co., New Castle, Pa., narrowly escaped asphyxiation from leaking gas, in the office of the company some days ago. Mr. Raney was almost unconscious when taken from the office, and was conveyed to his home for medical attention.

Benj. F. Hadley, of the Diamond Machine Co., Providence, R. I., has been in Cleveland the past week, arranging for the establishment of a Central Western agency of his company. Its specialties are grinding and polishing machinery and combined lever and screw feed hand lathes.

W. G. Mather, president of the Cleveland-Cliffs Iron Co., has offered to provide the first year's equipment, if the board of education of Ishpeming, Mich., will establish a manual training department in connection with the high school of that city.

James Gayley, who retires from the superintendency of the Braddock plants of the Carnegie Steel Co. to go into the Pittsburg offices, was given a silver dinner service by the under superintendents and foremen at the works.

H. C. Frick, who has been in Florida recently, returned to Pittsburg this week. Fresh Pittsburg newspaper gossip as to the changes in the company's official list early in the year, with accompanying reports of a more complete separation of the coke and steel-making interests, in the future, were very emphatically denied by Mr. Carnegie, when repeated to him at New York. Mr. Carnegie sails shortly for England.

Jos. G. Butler, Jr., of Youngstown, general manager of the Brier Hill Iron & Coal Co., who fell on the ice some weeks ago, breaking his leg, was able to be out for the first time this week.

C. B. Holland, managing director of the Otis Steel Co., has returned to England, to attend the annual meeting of the shareholders of the company shortly to be held at London.

THE Superior graphite paint, manufactured by the Detroit Graphite Mfg. Co., of Detroit, is in more and more general use on bridges, vessels, rolling stock and public buildings. Capt. Shaw, of the well known lake freighter the E. C. Pope, says that after a year's use in the water compartment of his steamer, it today has the same appearance as when first applied. The transfer boats in the Detroit river all use it and 40,000 square feet of the Detroit Union Station Association viaduct were painted with it some time ago to protect the iron work from the smoke of locomotives on the Michigan Central tracks below. The board of public works has adopted the Superior graphite paint for the iron bridges in that city and it is being used on similar structures in various parts of the country. It is in increasing use by ship building and bridge-building companies, in view of the excellent qualities it has shown under trial, as a coating for iron work of all descriptions.

The new power house of the City and Suburban Railway Baltimore, on Dugan's wharf, is nearing completion. It is to be fitted with an elaborate system of coal and ash-handling machinery, which will be installed by the C. W. Hunt Co., New York City. The apparatus is designed to receive coal either from vessels or cars and carry it to the top of the storage bins, which will be situated over the boilers. From these the coal is drawn into weighing and measuring shutes, directly into automatic stokers. The same conveyor which handles the coal will take the ashes to a receiving bin, from which they will be taken away by wagon.

RICHARD L. WHITTON and Irving B. Bates have estabilised a Cleveland agency of the Detroit Graphite Mfg. Co., with office at 503 Perry-Payne Bldg., and will push the Superior graphite paint of their company among shipbuilders, bridge-builders, tank builders and all structural iron-working concerns in tributary districts.

THE IRON TRADE REVIEW

DEVOTED TO
IRON AND STEEL MANUFACTURE, FOUNDRY AND MACHINERY TRADES, IRON ORE PRODUCTION, TRANSPORTATION, AND GENERAL INDUSTRIAL PROGRESS.

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MARCH 21, 1895.

LAKE Superior charcoal iron was being produced on March 1 at a weekly rate of 2,455 tons, or about 125,000 tons a year. Six furnaces were active, five in Michigan and one in Wisconsin, and 19 out of blast. The decrease in active capacity is 229 tons a week from March, 1894, and 1774 tons a week from March 1, 1893. The record for the three years is as follows:

LAKE SUPERIOR CHARCOAL IRON FURNACES.

	In blast.	Weekly capacity—tons.	Out of blast.	Weekly capacity—tons.
March 1, 1895	6	2,455	19	5,783
March 1, 1894	6	2,684	19	5,595
March 1, 1893	12	4,229	14	3,590

The total active capacity of all the charcoal furnaces of the United States is estimated at 3,579 tons a week March 1, 1895, against 4,523 tons on the same date in 1894, 8,727 tons March 1, 1893, and 11,550 tons March 1, 1892. The present output of iron, from all fuels, is at a yearly rate of about 8,000,000 tons. This is a falling off of about 12 per cent from the total in the big year 1892. The current charcoal production, it will be seen, has fallen off sharply in comparison with the total, being now at a rate less than one-third that of 1892, and about 40 per cent of that of 1893 at the same time.

THERE was a gleam of humor in the discussion on ore crushers, at the Lake Superior Mining Institute's recent meeting at Tower, Minn. The breaking of castings in the attempt to crush ore had been so regular a feature of some of the operations on the Marquette range, that as one of the mine managers put it, everything about the crushers had been smashed except the oil-holes and there was little doubt that these would be the next to go.

THE policy now pursued by many foundrymen, of taking their iron directly from the car to the cupola and carrying no stock in their yards may lead to some embarrassments later in the season, should foundry work expand to the volume generally hoped for. By wheeling from the car to his cupola, the foundryman saves probably three to five cents a ton, representing the cost of piling iron in yard and then loading it into barrows as it is taken to the cupola. Against this saving is the risk of a shut-down in case of any interruption to railroads that would cause athree or four days' delay. Some furnaces are carrying heavy stocks of iron, all of it sold, besides having contracts covering their output for some weeks ahead; yet the reluctance of foundrymen to have iron on hand holds back shipments. Here and there a large melter of iron will carry a two weeks' or three weeks' supply, but this is the rare exception. Should there be even a moderate, yet general, quickening in the demand for castings and foundrymen with one accord begin to call for their iron, it can readily be seen that some of the furnaces would be quite unable to make deliveries fast enough. Their facilities for loading the iron on hand would be inadequate to the prompt filling of a large number of small orders, with any assurance of sending just the grades called for. Such a contingency as this may not occur; it would seem, under present conditions, that foundrymen would prefer to see before believing. But it is entirely reasonable to look for an enlargement of foundry operations in the next few months, and if it comes and the present policy as to shipments is still maintained, there is no question as to the difficulties with which both makers and melters of iron will be struggling, in their effort to keep up connections between furnace and cupola.

THE Treasury Department's volume on Commerce and Navigation of the United States for the fiscal year ending June 30, 1894, gives the sources of the iron ore imported by the United States in that period as follows:

	Tons.		Tons.
Germany	1.	Canada	269
Italy	4,816.	Cuba	150,964.
Portugal.	1,019.	Turkey in Asia	3,200.
Spain	45,120.	British Australasia	152
England	8,218.	French Africa	4,791

The total was 218,550 tons, of which 127,603 tons was received at Baltimore, 89,713 tons at Philadelphia, and scattering amounts—about 1,200 tons in all—at New York and other points.

THE reports of the railroads, month by month, indicate that the turn has not yet come for the carrying industry. Earnings of 131 lines reporting to the *Financial Chronicle* were $33,303,022 in February, a decrease of $718,346 from February, 1894. The latter month showed a decrease of $4,654,203, or 12.54 per cent, from February, 1893, which in turn was $1,322,271, or 3.5 per cent behind February, 1892. The 100,620 miles represented in the earnings reports for February this year produced somewhat less than the 89,374 miles from which $33,484,366 in earnings was produced in 1891. Chicago grain receipts fell off heavily from February of last year, so that Western roads show large shrinkages. While the movement of cotton on Southern roads was 37 per cent larger than in February, 1894, snow impeded traffic and earnings were unsatisfactory. Middle and Middle Western roads gained over '94, as did also the systems in the Southwestern group.

TO ONE who did not understand how political partisanship has colored much that has been spoken and written on tin plate development in the United States, there might be difficulty in explaining how in a brief two years from the denial of home tin plate manufacture, by the Chief Executive, there should be serious discussions in the non-political trade press about a possible over-production in that very line. There is, to be sure, a good deal of guessing and estimating, in the current talk about over-doing tin plate manufacture. Many of the projects with bonus attachments will never grow into mills; but enough actual building has been going on in the past year, and enough more is planned by concerns with the means to carry out their undertakings, to make Welsh manufacturers exceedingly serious in their forecasts. The

capacity of mills built and building is put by Secretary Jarrett, of the Tinned Plate Manufacturers' Association, at 4,980,000 boxes a year; and others projected, he estimates, would bring this up to 6,720,000 boxes. He puts the annual consumption in the United States at 6,000,000 boxes, including 1,500,000 boxes exported in the shape of cans by the Standard Oil Co. and the various canneries. Mr. Swank, commenting in the *Bulletin* on this showing, gives Treasury Department figures showing that in the four years ending June 30, 1894, the imports and home production were 27,939,406 boxes, or 6,771,183 boxes a year, and adds:

It will be observed that Mr. Jarrett's figures of the annual consumption of tinplates in this country, including the export trade, are too low by from half a million to a million boxes. It should also be seriously taken into account that many of the prospective tin plate works mentioned by Mr. Jarrett may never be built. Besides, it is almost too much to expect that all the works actually constructed will annually work up to their full capacity. We have no doubt that eventually we will have the capacity to produce more tin plates than we can consume, but it is too soon, in our opinion, to assume that this result has been reached, or that is is dangerously near.

We concede, however, that, if we are always to obtain abroad the tin plates that we export in various ways, because these tin plates may be obtained virtually free of duty owing to the drawback provision of the tariff, then our capacity to produce tin plates is already near the actual home consumption. But why assume that exported tin plates will continue to be made abroad?

A SOUTHERN furnace company recently declared its 19th dividend of 5 per cent. in twelve years of operation. It has no bonded or floating debt, owns its own coal lands and has large ore deposits, with no indication of deterioration in the quality of the ore. While this company is not accustomed to lead in concessions on prices, its ability to make pig iron at the lowest cost attainable in the South can not be gainsaid, in view of its advantages over some of the heavily bonded companies in that section. It is a question whether some of the costs which are reported to have been attained at Southern furnaces make the proper allowances for interest and for royalties on ore and coal. What mine owners, of ore and coal, could get on every ton of either, were these properties leased to others, is just as much chargeable against pig iron cost as is interest on bonded or floating debt.

New Western Freights on Iron.

The new iron tariffs adopted by the Central Traffic Association, to go into effect April 1 will be of special interest to iron and steel manufacturers in the Central West. In general the change consists in dropping iron articles to the summer basis, that is, from fifth-class rates to sixth-class rates on car-load lots. What the new basis will be is indicated in the following table which gives the present and the new rates per 100 lbs. from Pittsburg, the valleys and Cleveland to Chicago and New York:

	To Chicago.		To New York.	
	New.	Present.	New.	Present.
From Pittsburg and Wheeling.....	15c.	17½c.	15c.	18c.
" Valley.....	13c.	16c.	17c.	20c.
" Cleveland.....	12c.	12c.	18c.	21c.

There is one exception to the action of last year, when the summer schedule went into effect. At that time iron in less than car-load lots dropped from fourth class to fifth class. In the schedule to become operative April 1 this year, iron articles in less than car loads remain in fourth class. On shipments from the valleys to Pittsburg, the present rates of 4½c on carloads and 6½c on less than carloads will be maintained after April 1. A change is made, however, on the manufactured iron rate from the valleys to Cleveland, which is reduced from 4½c to 4c on car loads.

The list of articles on which sixth class rates are to apply after April 1, as stated above, is a long one, including angles, axles, bars, beams, billets, bolts, brake shoes, car wheels, castings, chain iron, cinder, cotton ties, ingot moulds, nail plate, nails in kegs, pig iron, pipe, plate, rails, scale, scrap, skelp, wire, etc. For sheet bars, tin plate bars and wire rods, car loads, tariffs have been issued, on both east bound and west bound business, from points at which they are manufactured to points at which they are used, on a basis about equal to the rates on billets per gross ton. This gross ton rate on billets is considerably below sixth class, and applies on billets, blooms and slabs, rough and unfinished, not less than 1½ inches in thickness, the combined measurement of the width of the four sides of each being not less than 14 inches.

Lake Superior Iron Mines.

The Iron Mountain, Mich., *Range-Tribune* reports that the mines of Dickinson county are now furnishing employment to about 2,000 men, as follows: Chapin Co., 700; Pewabic Co., 400; Penn Co., 400; Aragon Co., 200, and Loretto 170. To take care of an increased flow of water at the Pewabic, an order has been placed for a powerful Worthington pump, capable of raising 1,000 gallons per minute.

Referring to the recent inspection of the Mesabi mines by members of the Lake Superior Mining Institute, the Norway *Current* says: "Very few with whom we have talked believe that the stripping proposition will be as profitable or as feasible as has been generally supposed, and underground work will be as costly in the Mesabi as in other districts. One gentleman who has had much experience with water says: When they get down where they have considerable water to take care of, where will they put it? The country is so flat that a system of pipes will have to be extended to every little water course, and if a mine which produces 500,000 tons in one year loses thereby $100,000 what will be the result when the ore must come from a greater depth?"

All legal complications attending the surrender of the leases of the Colby, Palms, Comet and Superior mines by the receivers of the Penokee-Gogebic Mining Co., have been disposed of. Operations will be concentrated on the Tilden, which is in shape to make a good output this season.

Members of the Minnesota legislature were on a tour of inspection among Mesabi and Vermilion range mines last week. The questions before the legislature, on which the trip was expected to throw light, are a proposed reduction in rail rates to the docks; rebate on State royalties, where the ore is reduced in Minnesota; reduction of royalties for a term of years, on mines of which the State owns the fee, and taxation of royalties paid to individuals.

THAT there is a marked improvement in some lines of business is apparent upon visiting the extensive works of the W. A. Crook Bros. Co., Newark, N. J. This concern has shipped to P. Sanford Ross, the well known dredging contractor of Jersey City, a rock-cutting and rock-breaking machine of large size, for use on Government work in the James River, near Richmond, Va. The machine has a total weight of about 45,000 lbs., cylinders 15", and drives two huge steam chisels, each 45 feet long and 10"x12" in diameter. These weigh between ten and eleven tons each, and are raised by friction drums operated by steam compressors. The machine was designed by A. Lambert, treasurer of the W. A. Crook Bros., especially for the work in hand—the breaking up of rock in the bed of the James River, so it could be easily lifted by dredges. A duplicate of this machine is now in course of construction by the same firm. Several others have already been built by them for similar work. The Messrs. W. A. Crook Bros. Co. are also constructing four logging engines of a new and special design, to be used in the forests of California for drawing logs. Other orders comprehend engines for Portland, Me., and Portland, Ore., also for Boston, Mass., and Newburgh-on-the-Hudson, N.Y.

THE River Furnace, Cleveland, operated by Corrigan, McKinney & Co., went out of blast last week for relining and will resume about May 1. A larger output than usual was made in the latter portion of the run.

AN explosion of hot gas from the furnace, in the air chambers of the blowing engine at the Edith furnace, Allegheny, wrecked the building. Operations at the furnace are suspended.

BOILER SETTINGS.

The past few years have witnessed great changes in the practice of steam engineering, the sharp competition in all branches of business causing a decline in the prices of the products of mill and shop. This has made the cost of production a matter of great importance to the manufacturers and one to which they have given much study. The cost of power, especially where steam is used is a very important factor in the case, and it has received much attention, the general result being that the simple high pressure and condensing engines that were formerly considered good enough are being replaced by the best types of compound and triple-expansion condensing engines. Foreseeing the necessity of better economy in the generation of steam, and of greater durability in the plants, the officers of the Hartford Steam Boiler Inspection & Insurance Co. were led, after a careful study based upon years of experience, to prepare improved plans for the setting of externally fired boilers of the plain cylinder or tubular types, these being the prevailing forms of boiler that are used in this country. Increased capacity and economy seemed quite feasible with this class of boiler. The proportion of grate area to heating surface and to the tube area were carefully considered, as well as every other detail of the setting. The ratio of grate area to heating surface was considerably reduced in comparison with the ratio in general use at the time the company's setting was designed, and it is also less than is used by many designers at the present day.

The width of the furnace in the settings advocated by this company is six inches less than the diameter of the boiler. Beginning just above the grate, the side walls batter at such angle as to make them 3″ clear of the boiler at the center, where the walls project inward and close against the boiler. This batter gives greater stability to the walls, and another special feature of it is, that it allows the heated gases to rise without impinging against the walls of the setting, and they flow away from the wall and distribute themselves evenly over the whole heating surface of the shell. The removal of soot and ash from the shells is also facilitated and, moreover, it is found that these deposits do not form so readily when the walls are battered as they do when the walls are straight, and the space between them is correspondingly contracted. The batter also increases the volume of the combustion chamber and allows of a more thorough mixing of the oxygen and furnace gases, the result being that complete combustion of the fuel is greatly facilitated. The bridge-wall slopes back from about four inches above the grate at an angle of 40° in order that the radiant heat from the fire may be diffused over a large portion of the boiler shell. The flame bed back of the bridge wall slopes down to the level of the boiler-room floor. It is paved for easy cleaning and the combustion chamber is large enough to make examinations and repairs to the boiler comparatively easy. The cleaning door in the rear wall is placed on a level with the flame bed in order that ashes may be readily removed and as it is below the currents of highly heated gases, loss by radiation through the door is largely prevented. The loss or waste of heat from this cause is often very great and it has not generally received the attention it deserves. Another point that demands more attention than it usually receives is the liability of leakage of cold air through the walls of the setting with the resulting reduction of furnace temperature. To avoid loss of temperature from this cause heavy double walls are constructed in this company's settings, the outside walls of a battery having a two-inch air space between them. The division walls between two or more boilers should have a half-inch clear space between them, to allow free and independent expansion of the walls. With a solid wall and one or more boilers of the battery stopped, one side of the wall separating a boiler in use from another one out of use would be hot and greatly expanded, while the other side of it would be cool; the result being that the bonded or solid wall must necessarily be severely strained or injured, and the joint in the masonry quite probably broken by the unequal expansion. Excessive leakage of air is likely to follow. These criticisms apply to all solid-built boiler settings. While the heavy double walls are somewhat more expensive in first cost, the increased economy and capacity of the boilers, as well as the greater durability of the settings, fully warrant their construction. The results obtained in many large plants fully sustain this statement.

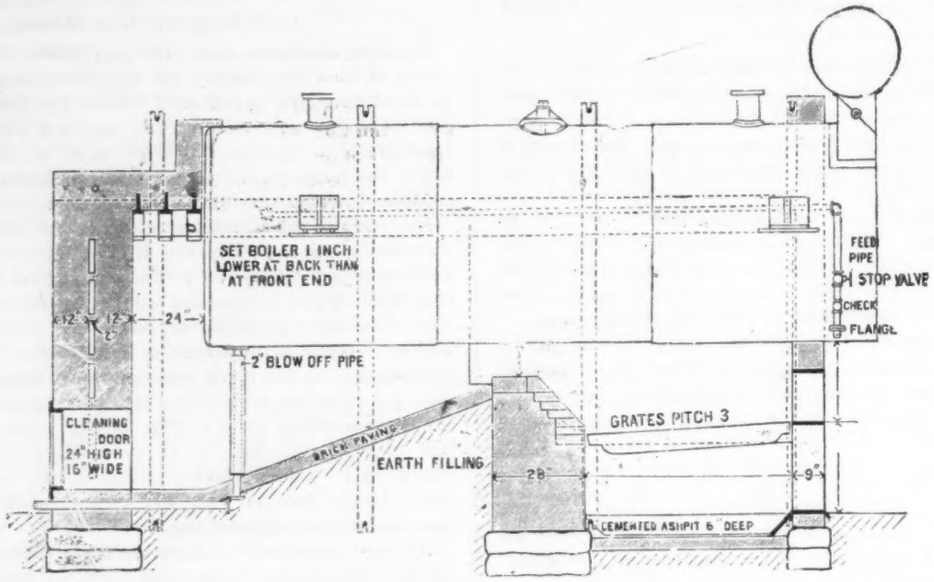


FIG. 1.—SIDE ELEVATION OF SETTING.

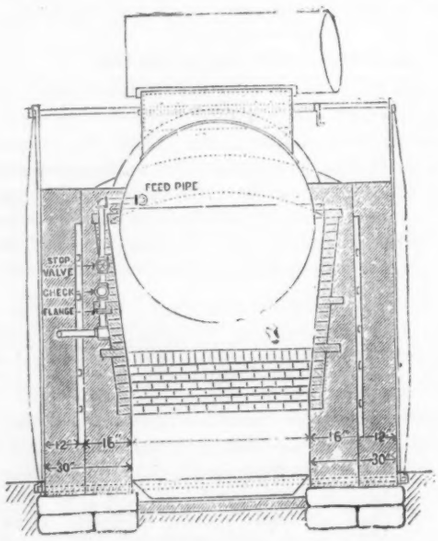


FIG. 2.—SECTION THROUGH FURNACE.

The exposed portions of the boiler shells above the settings are covered with plastic non-conducting covering 2½″ thick.

This is much lighter than brick, is a better non-conductor, and does not exert a sensible thrust upon the setting walls as a brick arch does. If leaks occur along the joints of the covered part of the boiler, they are quickly noted by the discoloration of the covering, and may be stopped before injury from corrosion occurs. The illustrations give the general arrangement of the settings above described, in which it is desired to combine durability with simplicity in design and construction, and at the same time to obtain good results from the boilers, both in economy and in capacity. To obtain the maximum economy in the combustion of fuel, we should obtain the highest temperature possible in the furnace, and the lowest temperature in the chimney—that is, in the chimney we should have a temperature not greatly in excess of that due to the pressure carried in the boilers, and we should admit to the furnace the smallest quantity of air that will insure complete combustion of the fuel.

With these ends in view, the relative proportions of grate area and heating surface, and all other areas and proportions of the settings, have been placed within certain limits determined by experience. It is well known that the intensity of heat produced by the fuel varies with the rate of combustion; and if a temperature of 2,200° to 2,500° can be obtained in the furnace, and the heat can be distributed over the heating surfaces, and can be so absorbed that the chimney temperature does net exceed 400° to 450°, the percentage of heat lost through the chimney is very small. It is possible to obtain such results with well-proportioned plants. Where a careful daily record of boiler duty has been maintained for several years with boilers of a nominal capacity of 100 h. p. each, and set in accordance with this company's designs, such boilers have shown an evaporation of 12½ pounds of water from and at 212°, per pound of combustible, and an actual capacity of 130 h. p. When running at full capacity such boilers frequently develop 175 h. p., with an economy of nearly 11 pounds of water evaporated per pound of combustible, for a week's run of daily duty in the mill. The flue temperature observed in such cases ranges from 400° to 500°. Economy and capacity in the generation of steam are not to be found in the most complex systems, but in those which are simple and which are construced in harmony with the laws of nature.—[The Locomotive.

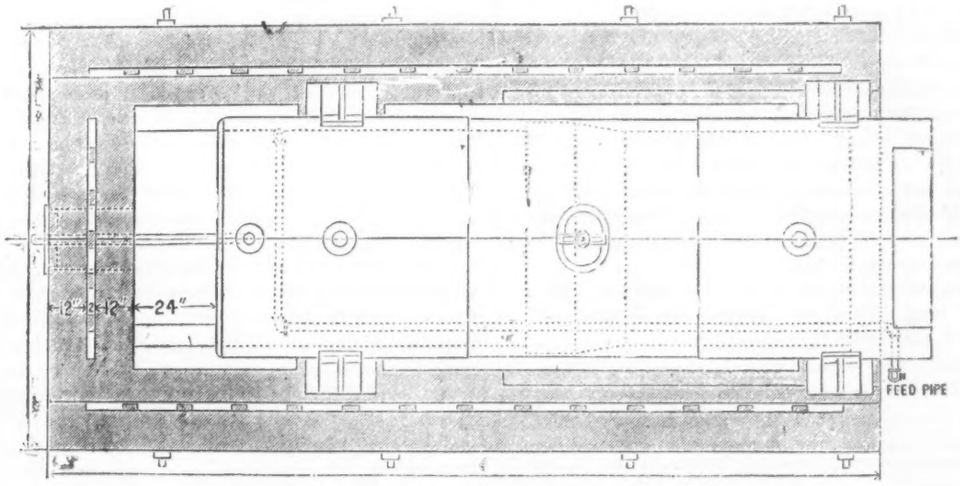


FIG. 3.—PLAN VIEW—SECTION THROUGH CENTER OF BOILER.

Moving for Scale Reductions in the Valley.

The iron manufacturers of the Mahoning valley met President Garland, District Vice-President McEvey and other officers of the Amalgamated Association at Youngstown, Saturday, March 16, and went over with them the changes in the scale which the manufacturers desire to have made on April 1, when the present arrangement expires. The valley iron mills, it was explained, are now at a disadvantage in competition with Pittsburg, owing to the low puddling price in effect at various mills in the latter district. Attention was called to the fact that $3.25 puddling was being done at Pittsburg and in one or two cases this figure had been lowered. Statements differ as to the size of the reductions proposed by the manufacturers and nothing has been given out officially on this subject. One report is that $3.50 for puddling and a 15 per cent reduction in the finishing scale was proposed; but there is greater probability of the correctness of the statement that the manufacturers have proposed a $3 puddling rate, with a 25 per cent reduction in finishers' wages. The propositions thus made will be sent to the various lodges of the Amalgamated Association and an answer returned by April 1.

The finishers' organization has no agreement with valley manufacturers at present. The notice given by the latter for the termination of the scale was 60 days old some weeks ago and the wages now paid are on the scale basis, because no new agreement has been made. It has been generally reported that an arrangement will be made, re-incorporating the finishers in their old organization and that when this is perfected the Finishers' Union will dissolve. While there have been denials, it is known that the officers have conferred about the matter; and in view of the fact that the finishers have been compelled by events to accept reductions more radical than any that were conceded by Amalgated officials when they were part of that organization, the reason for their separate existence seems in large part to have been taken away. Another grievance of the finishers that the puddlers managed to keep up their own wages, has been removed by the developments of the past 18 months.

Status of the Lorain Steel Plant.

General Manager Suppes, of the Johnson Co., who is drawing in all the numerous lines that must converge at Lorain about April 1, if calculations are met, is hopeful that the converters of the great steel plant will be blowing on that date. On June 11, 1894, ground was first broken for the new plant and to be making steel in less than 10 months from the first stroke of work is an unprecedented record. Pig iron and coke are already arriving at Lorain, and an army of men is crowding every part of the work. The two great engines for the rail and blooming mills, one of them requiring 10 cars and the other 15 cars for their transportation from the seaboard, are on the ground and the massive parts are rapidly finding their places. The aggregate weight of the machinery shipped from the Galloway shops in Manchester, Eng., was 451,560 pounds. Further arrivals of Johnstown, Pa., employes of the company are noted within the past week.

A Lorain dispatch of March 18 says that the statement was made at the meeting of the town council Monday night, that S. W. Croxton, manager of the Penn Iron & Coal Co., of Canal Dover, has an option on 10 acres of Johnson Co. land on the river front and that if the town would hasten the dredging of the river he would form a company and put up two blast furnaces, having them in operation by the end of the year. This enterprise is entirely apart from the Johnson Co.'s proposed furnaces, as well as from the furnace at Canal Dover which Manager Croxton's company is now renewing for the use of the Johnson Co. It is believed that no immediate steps will be taken in the erection of the Johnson Co.'s furnace plant at Lorain, perhaps in view of the transition state of furnace practice with the fine ores of the Mesabi range.

PHYSICAL TESTS OF CAST IRON.

Little has appeared of late in current foundry literature on the above subject, but it is known that the gentlemen who were especially active in the discussions of several months ago have not been idle. Others, too, have been conducting investigations on independent lines. The following statement is sent us by a Western foundryman, and is printed as a matter of current interest. The writer makes no deductions, but presents the facts as he finds them:

"In making the following trials I was largely influenced by recent articles written by Mr. West on this subject and in treating the test bars I followed as closely as circumstances would permit the lines laid down by Mr. West in the article above referred to. Mr. West, I believe, advocates the use of round instead of square test bars, stating that there is less liability to loss of strength, due to unequal shrinkage. In the same article in which he advocates the round bar, he also suggests turning down the test bars, as the outside film of metal receives a chill from the walls of the mold, and has much more combined carbon than the metal of the interior.

"The test bars used in the following trials were cast at the ——— works of the ———————. The bars were cast from good qualities of Bessemer pig and from foundry iron used for machine castings. An analysis of these irons showed the phosphorus in the foundry iron to be very high. The two irons were tested for both transverse and tensile strength, four test bars being used in each individual trial. The bars were all cast on end, the different sets of forms being cast from the same gate. In the sixteen bars cast there was only one which showed any sign of a flaw and that was very slight.

"In making the trials for tensile strength the bars were cast 1¼″ rounds, 20″ long. They were then turned down to 1″ diam. In pulling the test bars particular care was taken to see that the jaws of the machine were exactly in line and each piece was lined up separately to see that the strain was applied exactly in line with the axis of the test bar. In the fracture of the foundry iron the grain of the metal was much finer and the iron appeared much more close than the Bessemer iron. The tensile strength of the foundry iron is about 19% greater than of the Bessemer iron.

"The test bars for transverse trials were cast 1⅜″ diam. rounds, and 15″ long. They were then turned down to a diameter of 1.128″—one square inch area.

TRANSVERSE TRIALS.

Bessemer Iron.

No. of test.	Micrometer measureme't.	Broke at pounds.	Def. in inches.	State of fracture.	Strength lbs. per sq. in.
1	1.127″	1,810	Not taken.	Sound.	1,811
2	1.129″	1,730	"	"	1,729
3	1.128″	1,760	.109	"	1,760
4	1.127″	1,790	.094	"	1,789
Average..	.....	1,772	.101	....	1,772

Foundry Iron.

1	1.127″	2,200	.218	Sound.	2,202
2	1.127″	2,150	.187	"	2,152
3	1.128″	2,160	.203	"	2,160
4	1.129″	2,260	.233	"	2,258
Average..	.....	2,192	.....	.....	2,193

TRIALS FOR TENSILE STRENGTH.

Bessemer Iron.

No. of test.	Measurement of bar.	Area of broken section.	Broke at, pounds.	State of fracture.	Strength in lbs. per sq. inch.
1	1″ diam.	.7854 sq. in.	15,370	Sound.	19,569
2	1″ diam.	.7854 sq. in.	15,560	"	19,811
3	1″ diam.	.7854 sq. in.	19,940	"	25,388
4	1″ diam.	.7854 sq. in.	15,100	"	19,225
Average	.....	.....	16,492	....	20,998

Foundry Iron.

1	1″ diam.	.7854 sq. in.	20,340	Sound.	25,897
2	1″ diam.	.7854 sq. in.	21,340	"	27,170
3	1″ diam.	.7854 sq. in.	20,308	"	25,856
4	1″ diam.	.7854 sq. in.	20,250	"	25,782
Average	.....	.....	20,559	.....	26,176

"The bars were supported on edges 12″ apart and the thrust was applied exactly in the center. The bars were leveled up and every precaution was taken to see that the breaking strain was applied exactly at right angles to the axis of the bar.

"As in the case of the bars pulled apart the grain of the foundry iron was more dense and close than that of the Bessemer. The foundry iron appeared much more elastic and also much more brittle than the Bessemer. It showed a much larger deflection and on breaking would fly apart. The Bessemer iron, on the contrary, showed a much smaller deflection and hardly any signs of brittleness. On two occasions the pieces hung together after being broken. The transverse strength of the foundry iron appeared to be 19% greater than the Bessemer—about the same relative strength as shown by the trials for tensile strength. All the above trials were made on an Olsen machine of 200,000 pounds capacity."

PUBLICATIONS RECEIVED.

A handsome 30-page pamphlet with "Cahall" embossed in gilt on its cover, is circulated by H. E. Collins & Co., of Pittsburg, as a method of emphasizing the pronounced success of this boiler since the Pittsburg firm became sole sales agents for it. The special features of the Cahall boiler have been explained in these columns in connection with illustrations. The pamphlet before us gives photographs of various recent installations, which show the range of its special adaptations. In the utilization of puddling furnace heat and the gases of blast furnaces it has been notably successful. The point is made that in connection with blast furnaces using fine ores, its vertical surfaces present no chance for the accumulation of dust carried over with the gases to the boilers. It all falls to the bottom part of the boiler where provision is made for readily and easily removing it. Several test records are given showing the performance of the boilers under different conditions. The deduction is made from one of these that "this boiler, using the waste gases from a re-heating furnace, is very nearly equivalent to other boilers noted, which burned the gas directly beneath them."

"Around the Lakes" is a flat octavo, just published by the Detroit Dry Dock Co., containing probably more information concerning lake shipping and traffic than has been brought together before in a single volume. Acknowledgment is made in the prefatory note to F. M. Barton and J. M. Mulrooney, editors of the *Marine Review*, in whose hands the preparation of the work was placed, and certainly great credit is due these gentlemen for the production of a book so attractive and valuable. The board binding is white, with back of white cloth and the cover front has, beside the title, views in colors of ten well known vessels built at the Detroit company's yards. In the 250 pages are included a full list of lake vessels, with addresses of managing owners, a historical sketch, with numerous illustrations of the great plant at Detroit, and description of vessels built there. Condensed statistics of lake commerce, all valuable and interesting, occupy the remainder of the volume. The price is $2.

The latest poster of the Bickford Drill & Tool Co., Cincinnati, is an attractive broad-side illustrating their drilling, boring and turning machines, separate and combined. The center piece shows their radial drilling machine as driven by electric motor. A complete catalogue will be sent on application.

In their 1895 catalogue, which attractively represents their entire line of products in margin miniatures on the front cover, the Q. & C. Co., of Chicago, direct special attention to their cold-cutting metal-sawing machines. The Q. & C. shop saws, the Bryant metal-sawing machine and the Bryant power saw No. 10 are illustrated in half-tone with much detail. Letters are given from a number of important iron-working concerns telling of their satisfactory use of the shop saw. A list is also given of prominent users of the Bryant machines.

The Lodge & Davis Machine Tool Co., Cincinnati, is sending out scratch pads to the trade, with a machinery illustration heading each leaf.

THE Excelsior furnace at Ishpeming, Mich., which has been producing 55 tons of charcoal iron a day, is temporarily out of blast.

MACHINE-ROLLED CHAINS.

Consul J. C. Monaghan, at Chemnitz, Saxony, brings to the attention of the State Department at Washington a machine for making chain without welding, which is interesting in view of the efforts in this country and in England to produce a weldless chain, with greater strength and reliability than can be attained with hand-made links. While his description is in no sense technical and is very meager, the illustrations assist to a fair understanding of the process, starting with the "curiously formed" bar. The method of rolling the bar is not explained. We quote from the consul's report: The machine does away with the welded joint and secures uniformity, rapidity, and increased strength in construction. It was brought to my attention during an investigation of tin rolling. The new machine resembles somewhat the machine or roll that sinks impressions in hot or steamed wood, *i. e.*, its mode of working is similar. There is, first of all, the roll (Fig. 1) and, second, a peculiarly formed bar of iron (Fig. 2). The rolls are four in number, and are so situated and so arranged that they work simultaneously on the curiously formed iron bar, cutting it into links. A glance at Fig. 1 will reveal much more of the *modus operandi* than any description in words would do. The curves that look like chain links are the highly tempered, *i. e.*, hardened, steel dies or cutters. The gears fit into each other and operate simultaneously on the four flanges of the iron bar. At a point just back of the cross, that is, in front of the gears of Fig. 1, the projecting cutters of the gears almost meet. Through this point passes the iron or steel bar at white heat. The gears revolve rapidly, turning out three to four yards of chain per second. The iron bar that goes in looking like Fig. 2, comes out looking like Fig. 3. By means of tongs and cutters, and molds, Fig. 3 is made to look like Fig. 4, in which the links are held together by very thin bits of iron which are easily cut. After some little labor in cleaning the links, the chain is run into a furnace, heated red, and then run through rolls to give its links the shape seen in Fig. 5. It is claimed that this machine-made chain is better than the hand-welded; that it does not require wrought or welding iron, but that it gives better results with fused irons and steels."

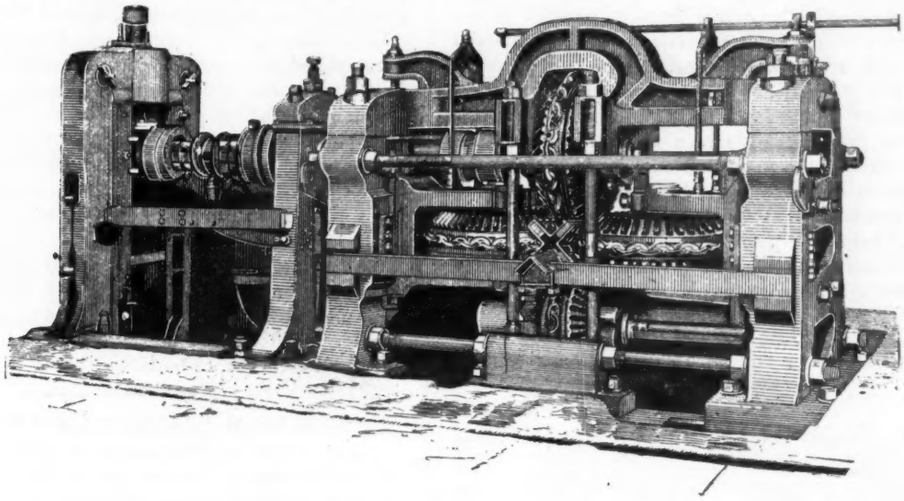


FIG. 1.

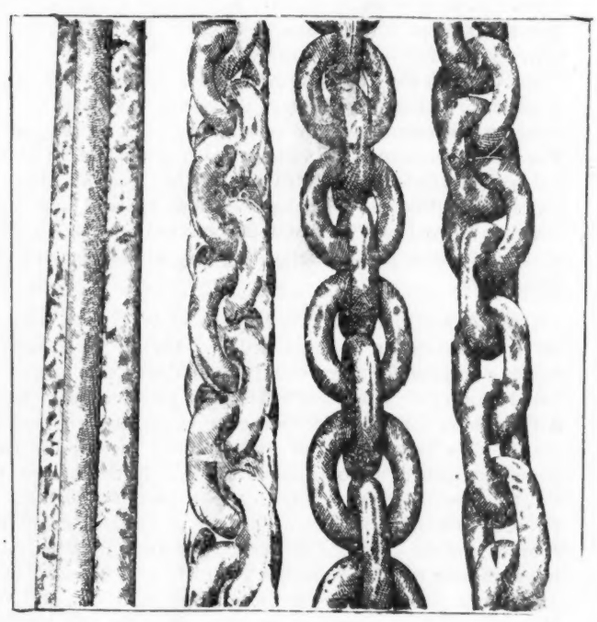


FIG. 2. FIG. 3. FIG. 4. FIG. 5.

EXPORTATION OF SOUTHERN IRON.

James Bowron, secretary and treasurer of the Tennessee Coal, Iron & Railroad Co., writing in the *Manufacturers' Record* on the possibility of exporting Alabama iron, tells why there need be little expectation of sending it to Great Britain, though he regards the markets of the Mediterranean and the Baltic as somewhat more promising fields:

"The subject of exportation of iron has occupied our attention for some time, and owing to my own familiarity in past years with the English iron trade, the correspondence has rather naturally fallen to my share. I have become perfectly satisfied that starting as we do, with the price about $2.50 per ton for gray forge or No. 3 foundry below the f.o.b. Middlesbro price for similar grades, we certainly ought to be able to compete in neutral markets. It will, however, require time and patience to attain this end, for the reason that the vast bulk of ocean tonnage is in the hands of English owners, who will make freight rates to facilitate English exports and obstruct ours. Unfortunately, American producers are handicapped by the fact that the tonnage of our exports largely exceeds the tonnage of our imports. We require double the steamer-room for shipment across of our grain, cotton, lumber, oil and provisions that is needed for the conveyance back again of tea, silks, cutlery, etc., which we import. This fact enables the English ship-owner to make the American charterer pay the cost of the round trip, and he is willing to accept a mere ballasting rate from England outwards to this country. I am am afraid, from this cause, that it will be impossible for some time to sell any iron in England unless it can be shipped to Manchester in conjunction with cotton.

"The markets of the Mediterranean and of the Baltic are not, however, subject to the same remarks, except to a limited extent, and I am quite hopeful that the rates which are now under the consideration of the Southern railways to Mobile, Pensacola and Savannah for foreign shipment will enable us actually to commence business with Italian, Spanish and Russian ports. In the absence, however, of any actual transactions having been concluded, I could not give any figures that would be in the nature of information."

THE Arethusa Iron Works of Geo. W. Johnson, at New Castle, Pa., are closed down for the time being. Youngstown is said to have made a proposition looking to the removal of the plant to that city. Canton, O., and Greenville, Pa., are also offering inducements for the mill. No decision has been reached.

FURNACE DUST-CATCHER REFUSE.*

BY WM. B. PHILLIPS.

While conducting some experiments in the magnetizing and concentrating of soft red ores, I was led to investigate the nature of dust-catcher refuse, in order to ascertain if it could be economically treated for the iron it contains.

Samples were taken at intervals extending over several days and well mixed so as to give a fair average of the material. Five hundred grams were taken for examination and analysis and screened over seives from 10 meshes to 100 meshes per square inch without pulverization. The material remaining on each screen was separated into two portions, magnetic and non-magnetic, by a current from three 1-quart "Samson" battery cells actuating a magnet. Thus the material left on the ten-mesh screen was divided into two portions; that through the 10 but left on a 20 mesh, into two portions, and so on with each succeeding seive.

An analysis was made of each portion, the magnetic and the non-magnetic. Below are given results, the first table showing the composition of the magnetic portions, and the second that of the non-magnetic portions:

MAGNETIC PORTIONS.

Residue on	Per cent of total by wt.	Iron. per ct.	Phos. per ct.	Alumina. per cent.	Lime. per ct.	Insol. per ct.
10-mesh seive	0.06	51.93	0.39	3.00	2.75	15.00
20 " " ...	0.53	38.42	0.26	3.90	3.20	19.95
30 " " ...	5.34	43.38	0.28	3.25	4.40	17.30
40 " " ...	6.62	39.46	0.30	4.14	6.90	21.70
50 " " ...	10.30	41.54	.....	4.18	7.20	18.96
60 " " ...	9.00	40.38	.....	4.00	7.80	17.96
70 " " ...	10 00	41.67	0.32	3.50	6.80	14.68
80 " " ...	35 00	44.00	.....	4.50	6.00	14.00
100 " " ..	10.00	45.00	.....	4.00	5.50	13.50
Thro' 100 m. seive	13.15	44.00	.....	3.75	7.00	14.00

The first thing that attracts attention is the fineness of the material, more than one-third of it passing a 70-mesh seive, and more than one-fifth passing an 80-mesh seive. The percentage of iron varies from 40.38 in the material passing a 50 and remaining on a 60-mesh seive, to 51.93 in the material remaining on a 10-mesh seive. The average percentage of iron is 43.03, and of insoluble matter 16 70.

It would be impracticable to pass the refuse through such fine screens and then concentrate it over a magnetic separator in order to obtain a product no better than is indicated by these analyses. If one should use a 70-mesh screen, he would lose 58% of his material, and 23% if he used an 80-mesh screen.

So far as concerns the screening of the refuse, it is not to be recommended. If the entire material as it comes from the dust-catcher should be treated magnetically, we could not hope to secure, on the average, more than 43% of iron, nor less than 16% of insoluble matter, in the concentrates, while we would throw away a large amount of available fuel represented by the non-magnetic portions.

The composition of these non-magnetic portions is given in the following table:

NON-MAGNETIC PORTIONS.

Residue on seive.	Per ct. of total by wt.	Vol. matter pr. ct.	Fixed carb'n pr. ct.	Ash per ct.	Ox of iron pr. ct.	Alum'a per cent.	Lime per cent.	Silica per cent.	Phos. per cent.
10-mesh.....	0 73	3.30	70.95	25.75	6.58	4.72	2 60	7.40	0.10
20 "	3.42	2,20	76.30	21.50	4.12	2.68	1.50	6.40	.....
30 "	8.66	3.80	71.40	24.80	3.70	2.50	1.60	9.35	.....
40 "	4.49	2.80	61.80	35.40	2.68	4 14	5.50	15.15	.....
50 "	4 40	6.10	52.70	41.20	4.44	4 06	8.40	20 20	.....
60 "	3.30	6.15	53.95	39.90	3.75	4 00	9.00	17.20	.....
70 "	3.00	6.70	47.85	45.45	12.26	3.00	8 50	17.30	.....
80 "	5 00	7 00	45 50	47.50	11.50	3.75	10.00	18.50	.....
100 "	4 00	6 00	42.00	52.00	13.00	4.00	9.00	20.00	.....
Thro' 100-m...	2 00	5.00	41.00	54.00	12 00	5.00	8.00	22.00	.....

The average percentage of fixed carbon is 56.34, and of ash 38.75, the ash containing a notable amount of lime, especially as the fineness increases. The presence of metallic iron in the refuse may be due to particles mechanically removed from the bell and hopper during charging, or to reduced iron held in a very finely divided condition, or to both these causes. When it is treated with hydrochloric acid, there is an evolution of evil-smelling hydrocarbon gas, such as comes from cast iron when treated with acid. But the amount of metallic iron is small, as is shown by the low content of total iron, which is but little above the metallic iron of the burden. If this material were handled over a dry magnetic concentrator, there would be a great quantity of dust, with its consequent troublesome effects. A wet concentrator of the Finney-Lovett type would handle it to better advantage, especially as the difference between the specific gravity of the concentrates and the tailings is so great. It has been recommended by a past president of this society, Mr. C. A. Meissner, to mix this material with tar, or other suitable binding stuff, and compress the mixture into bricks for use as a part of the burden, and the suggestion is worthy of attention.

The flue dust from two furnaces in this district will amount to ten tons per day of 24 hours, which will contain 43% of iron, or 4.3 tons. This is now going to waste, and it does seem that some means could be devised for saving it.

When the magnetic concentrator now building at Bessemer is completed, it is our purpose to mix a certain quantity of dust-catcher dust with the ore as it goes to the separator, to ascertain whether or no its economical treatment can be effected in this way. No great amount can be thus used, because the metallic iron in the concentrates from the dust cannot be increased above 44 to 45%, which is from 12 to 14% below the percentage of iron which we hope to obtain from ore concentrates.

If some method could be devised for mixing this dust with coke braize and molding into bricks, it would prove a not unwelcome addition to our burden. But the saving of by-products in this district seems to await a greater competition, or a larger population, or both.

*Read at the meeting of the Alabama Industrial and Scientific Society, at Birmingham, Ala., Dec. 14, 1894.

Industrial Activity at Chicago Heights.

A visit to Chicago Heights, the large and prosperous manufacturing suburb of Chicago, last week, showed that none of the firms located there are suffering from business paralysis. Nearly all the manufacturing plants are running on full time, some of them day and night. The Inland Steel Co., manufacturers of miscellaneous steel shapes, plow beams, etc., report a good demand for their product, and say their sales are much larger now than a month or six weeks ago. The Walburn-Swenson Co., mining machinery, sugar and dye works machinery, say that they are busier now than for the past several weeks. Their foundry, for example, is taking off a heat almost every day, as compared with one or two heats a week in early February. The demand for their manufactures is a good deal better. The Canedy-Otto Mfg. Co., makers of forges, dies, reamers, etc., report that while business is rather quieter than they would like, it is picking up considerably, and they expect it to improve further as the season advances. The Illinois Screw Co. have recently located at Chicago Heights. They have not started in full force yet, but expect to be running their factory full in a short time.

The Chicago Heights Land Association reports an excellent demand for residence property. It is expected that quite a building movement will be seen a little later in the season. The Land Association is figuring with several large manufacturing estab ishments with a view to locating them at Chicago Heights, and with the excellent railroad and other facilities offered will undoubtedly succeed in getting a fair share of the new plants that will go up in Chicago suburbs this season.

THE Edward P. Allis Co., of Milwaukee, Wis., have recently received a number of large orders. Among them were a blowing engine for the Penn Iron & Coal Co.'s furnace at Canal Dover, O.; a hoisting engine for Johannesburg, South Africa; three 1,000 h. p. vertical cross compound engines for the People's Traction Co., of Philadelphia; three cross compound engines of 1,000 h. p. each for the North Chicago Ry. Co., Chicago; four pairs of 1,000 h. p. engines for Detroit St. Ry. Co., Detroit, Mich.; two 1,000 h. p. tandem compound engines for the Citizen's St. Ry. Co., of Detroit, Mich.; two large engines for the American Tin Plate Co., Elwood, Ind.; one 2,000 h. p. engine for the Union Depot R. R. Co., St. Louis, Mo.; two 500 h. p. cross compound engines for the Portland R. R. Co., of Portland, Maine; one 400 h. p. cross compound engine for the El Paso Electric Co., of Colorado Springs, Colo., one 500 h. p. engine for the American Mining Co., of El Oro., Mexico, besides a large number of others.

THE River Furnace & Dock Co., Cleveland, O., has been incorporated by Stevenson Burke, James Corrigan, Earnest T. Laundon, C. W. Marsh, and Price McKinney. Capital stock, $100,000.

Cost of Armor Plate.

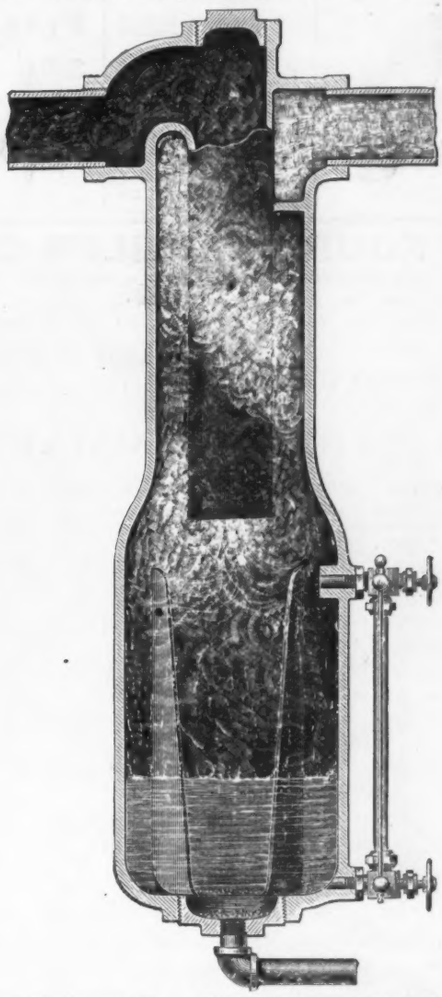
The first armor made for the Government by the Bethlehem Co., ranged in price from $490 to $600 a ton. The average price was $538.70. This was in 1887. When nickel steel was adopted, the Government furnished the nickel and allowed $11.20 a ton for the additional cost of manufacture. Orders for nickel steel armor were given, at prices ranging from $500 to $575 a ton, while two lots, presenting especial difficulties in manufacture, cost $600 and $725 a ton.

When Harveyized armor was first made, a royalty of $11.50 a ton was paid to the Harvey Steel Co., and $50.40 a ton to the armor makers for plates eight inches thick and upwards $78.46 for plates from five to eight inches and $100.80 for those under five inches. One item which increases the cost of our armor is the 3.25 per cent of nickel which it contains as against 2 to 2.5 per cent in foreign armor. French armor costs $444 to $463 for nickel steel, with a price of $331.46 for that made for foreign trade. The corresponding English price is $358. For Harveyized steel, the English domestic price is $501 to $526, the foreign price, $307 to $341. The custom of selling at lower prices to foreign dealers seems to be general. It has caused the introduction of a clause in the naval bill just passed by Congress requiring makers to furnish armor to the Government at a price no higher than that charged foreign buyers.—[Railroad Gazette.

TEST OF THE STRATTON SEPARATOR.

Prof. R. C. Carpenter, of Cornell University, recently made a test of a Stratton improved separator, and in his report states that "the results show that this apparatus is practically perfect and removes all the moisture that can be taken from steam by mechanical means." For the test, the steam pipe leading to the separator was surrounded for a portion of its length with a jacket, which could be filled with water to any desired height, the purpose of the water jacket being to condense as great a per cent of the steam as possible. The discharge of steam from the separator was led to a surface condenser, where it was condensed and the amount carefully weighed. The drip of water discharged from the separator was led to a barrel standing on a pair of scales and accurate weighings were made of the water taken out from the steam by the separator.

A throttling calorimeter was placed in the steam pipe directly after the steam left the separator. Pressure gauges were placed either side of the separator. Observations were taken and the results reduced by Messrs. Collins, Hubbard and Thomas, of the class of '94. The following is the general summary of the results: The steam supplied to the separator contained moisture, the percentage of which varied from a



little over five to nearly 21. That discharged from the separator was in every case nearly dry, it containing in every instance less than one per cent of moisture. The separator was worked up to its full capacity, and there was no appreciable reduction of pressure. The summary of the results of different runs is given in the appended table. During these runs the water was kept at a constant height in the separator:

No. of run.	Pressure of steam.	Moisture in steam supplied separator. Per cent.	Moisture in steam leaving separator. Per cent.	Quality of steam leaving separator—per cent of dry steam.
1	60	6.55	0.95	59 05
2	61	17.2	0 94	99 06
3	62	15 31	0 9	99 1
4	76	15.6	0.6	99 4
5	61	20 9	0 8	99.2

This separator is manufactured solely by the Goubert Mfg. Co., No. 14 Church st., New York.

Machines for Wor

Patent Gap Shears.

Patent Gap Shears, Especially Squaring, T Slitting. 6 to 18 inch throat for Slitting Wide Sheets. Complete for Tin or Iron, o 14 gauge. Seven Styles of various lengths HAND AND POWER

General Purpose Punch and Shear. Seven Sizes.

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MARKERS FOR
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FOR PREVENTION OF SCALING AND REMOVING SCALE ALREADY

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INDUSTRIAL SUMMARY.

New Buyers in the Market, and Some of Their Wants:—

[If you are in need of machinery of any description, please notify *The Iron Trade Review* and we will put you in communication with our advertisers at once.]

F. H. Madden, 3 State st., Chicago, wants to buy a 15 to 20 h. p. horizontal engine, automatic preferred.

H. C. Graves & Son, Council Bluffs, Iowa, are in the market for a second-hand boiler of from 25 to 30 h. p.

At Kalamazoo, Mich., O. P. Johnson and E. P. Crocket, of Detroit have started a foundry, making a specialty of brass work.

The Shuster Foundry Co., of South Pittsburg, Tenn., has been incorporated. F. Shuster was elected president, and Jos. Lodge vice-president.

F. Smith & Sons, Clinton, Iowa, are in the market for one 75 h. p. or two 50 h. p. engines, together with necessary boilers, second-hand. Must be in good order.

New Construction:—

The City Comptroller, of New Orleans, will ask for bids for building several iron bridges at that city.

A sheet rolling mill will be erected at Struthers, O., by Thos. Struthers, of the Struthers Rolling Mill Co.

The Eaton Iron & Steel Works, of Eaton, Ind., will erect a plant for the manufacture of iron and steel.

The Emmett Steel Co., of Greensburg, Pa., will receive bids for the construction of a plant and for machinery.

The Frankton (Ind.) Foundry & Machine Co., is building a plant for foundry and machine work, and the manufacture of stoves.

The new machine shop of the Carnegie Steel Co. will be 150x250 feet, built of fire brick, and will be equipped with electric cranes.

At Anderson, Ind., the Hill Foundry & Machine Co. has let contracts for the rebuilding of its foundry. The present structure will be torn away April 1.

The Vandergrift Mfg. Co., of Jamestown, N. Y., is building as soon as it is finished. The plant will consist of a foundry, pattern shop and office building.

At Washington, Pa., a company is to be chartered, known as the Washington Improvement Co. It has taken options on $190,000 worth of farm land near the city. The industrial plants to be located include a glass works, a brick works, a four-mill tin plate plant and a rolling mill. Joseph Painter, of Pittsburg, is mentioned as the organizer of the movement.

The Westinghouse Maching Co. advertises for proposals for the construction of new shops at East Pittsburg, Pa. Bids will be opened March 30. The main building is to be of brick and steel, 602x223 feet and two stories high. It will be patterned after the Westinghouse Electric Co.'s buildings, which adjoin. The main structure will include the foundry, machine shop and warehouse. The boilers and heavy steam hammers will be in another new building, connecting, which will be 60x200 feet, and of similar construction.

The denials by the Illinois Steel Co., of any planning for a large tin plate plant do not prevent *Tin and Terne* from saying again that this company will erect such a plant. It adds: "The engineer who designed the La Belle plant at Wheeling, Mr. F. H. Moabley, has been engaged to prepare plans for the plant for submission. The details of course have not yet been arranged, and it is not likely that work will be commenced before fall. It has, however, been decided that an 18-mill plant will be designed, with 12 cold mills. This would be

MOUNT SAVAGE FIRE BRICK.

UNION MINING CO.,

Proprietors of the CELEBRATED Mount Savage Fire Brick.

GOVERNMENT ⁑ STANDARD.

Established 1841. Capacity, 60,000 Per Day; 18,000,000 Per Year.

The First Manufactory of its Kind in the U. S.

Home Office and Works:—MOUNT SAVAGE, Allegany County, Md.

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THE AMERICAN FIRE BRICK & CLAY CO., Mineral Point, Ohio.

HIGH GRADE FIRE BRICK for

Rolling Mills, Steel Works, Blast Furnaces, Cupola Linings, Boiler Settings.

— All Shapes in Stock —

Our large capacity, 8,000,000 annually, and modern plant, enable us to handle contracts of any size promptly.

Ground or Calcined Clay in Sacks or Bulk.

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The leading BRICK of this country.

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OHIO FIRE BRICK. ALL SHAPES IN STOCK.

The largest shippers of FIRE BRICK in the West.

Warehouse and Docks: 193-195 Merwin Street,

CLEVELAND, OHIO.

somewhat larger than any American or Welsh mill in operation at present, unless the Morewood plants in Wales and America be taken together.

Additions, Enlargements, Removals, Etc.:—

Cowan Bros., Ashland, O., will add a machine shop building, 25x65 feet.

The P. & F. Corbin Co., of New Britain, Conn., will make large additions to its plant.

The New Philadelphia (O.) Iron & Steel Co. is making important additions and improvements to its plant which wi l increase its monthly capacity to 1,400 tons of iron and steel sheets.

The Arcade File Works, of Anderson, Ind., is erecting a large building, this being the third enlargement made necessary in the past twelve months by the demand for the goods manufactured.

Fires and Accidents:—

At Chicago, a loss of $10,000 by fire is reported by the Andrews & Johnson Co., tin and sheet iron workers

The plant of the Field Force Pump Co., of Lockport, N. Y., was destroyed by fire recently with a loss of $25,000; insurance, $12,000.

General Industrial Notes:—

The Plymouth iron foundry, Plymouth, Mass., has resumed operations.

Greenwood furnace of the Logan Iron & Steel Co., Lewiston, Pa., will blow in in a short time.

The Rhode Island Locomotive Works, at Providence, will ask creditors for a five years' extension.

Geo. D. Todd, of the Todd-Donigan Iron Co., has assumed the management of the Kentucky Machinery Co., of Louisville.

The Badger State Iron Works machine shop, at Milwaukee, is reported sold to John L. Kunz, proprietor of cut gear works.

At Cincinnati, a receiver was appointed for the Radford Pipe & Foundry Co. The assets are estimated at $500,000, with liabilities about one-half.

The Moore Mfg. & Foundry Co., of South Milwaukee, has booked an order from the Southern Railway Co., for all the hardware needed for 1,000 cars.

Hannah furnace of the Mahoning Valley Iron Co., Youngstown, O., which has been undergoing extensive repairs of late, will probably be blown in this week.

The Buckeye Mfg. Co., of Anderson, Ind., has increased its force to 250 men. Another increase will be made later, and the plant put in operation about April 1.

The Johnson Forge Co., South Wilmington, Del., will start its mills shortly after an idleness of nearly a year.

The Pennsylvania Midland has given an order to Murray, Dougal & Co., of Milton, Pa., for 700 cars, the order including 500 hopper coal cars, 100 box cars and 100 platform cars.

The Brooklyn Elevated Railroad has decided to repaint six miles of its structure, and work will commence about April 1. The road will also require a large amount of paint for station work.

A new blowing engine, with 32-inch steam cylinder, 72-inch blowing cylinder and 48-inch stroke is being built for Sarah furnace at Ironton, O. It will be a duplicate of the engine now in use.

The Edgar Thomson Steel Works, at Braddock, Pa., have just completed an order for 1,650 100 lb. rails for the Pennsylvania R. R. Co. These are the heaviest rails ever produced in this country.

The Washburn & Moen Mfg. Co., Waukegan, Ill., recently made a cut in the wages of certain workmen and 100 quit. The works have been busy, but the management complain that competition has eliminated profit.

Five angle bars, 6x8 in. and 100 ft. 6 in. in length, were recently rolled by the Phœnix Iron Co., at Phœnixville, Pa. These bars weighed 90 lbs. to the yard, and are the longest and heaviest ever rolled by this company.

Thus far only 1,800 tons of rails have been given out for the Trinity, Cameron & Western Railway in Texas, though the dispatches refer to it as a "very large order." More rails will be bought later, but probably only in small lots.

A decree was made recently at Media, Pa., ordering that the return of sale of the Wellman Iron & Steel Co., at Chester, Pa., be placed on file, and that it be confirmed absolutely. The purchasers at the sale were J. Tatnall Lee, William Burnham and W. G. Neilson. The price was $17,000 over the $583,000 indebtedness.

The Walter A. Wood Harvester Co., of St. Paul, confessed judgment on notes aggregating over $25,000 last week, in Chicago and on other notes of over $15,000 in other cities. It is expected that arrangements will be made in the present week to straighten out the affairs of the company. The capital stock of the company is $2,500,000, and according to its officers, it has $3 of assets for every one of liabilities.

Recent car orders: The Lackawanna car contract for 500 freight cars has gone to the Jackson & Woodin Mfg. Co. The Standard Oil Co., is building 100 tank cars. Memphis Car &

Foundry Co. Memphis, recently delivered 16 tank cars to Farrell & Co., Omaha, and has a conditional order for 15 more. The Denver & Rio Grande, reported to be in the market for 1,000 cars, will not order any now, but will take up the matter later. The P. & L. E. has ordered 500 freight cars from the Michigan Peninsular Car Works, Detroit. The Union Tank Line is preparing plans for 90 cars, over 40 feet long. The Chicago, Paducah & Memphis is about to buy 200 cars.

H. E. Collins & Co., Bank of Commerce Building, Pittsburg, sole sales agents for the Cahall vertical water tube boiler, manufactured by the Aultman & Taylor Machinery Co., of Mansfield, O., have sold within the last ten days, to the Inland Steel Co., of Chicago Heights, a 200 h. p. boiler, which is the second order received from the Inland Steel Co. They have sold to the Shoenberger Steel Co., of Pittsburg, 400 h. p.—the fourth order received from that company—and to the Michigan Alkali Co., at Wyandotte, Mich., 500 h. p. The 2,000 h. p. of Cahall boilers installed at the Carnegie gas pumping plant at Bagdad, Pa., was put in operation in the last ten days to the satisfaction of all concerned.

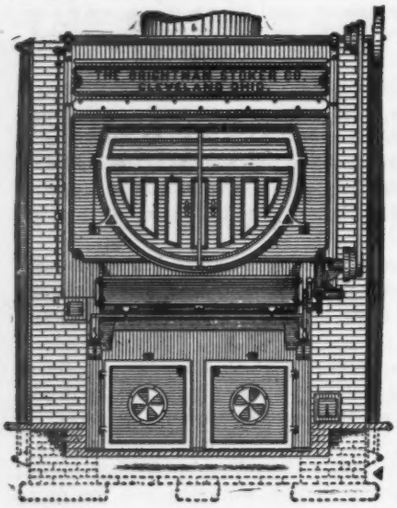
As one of the large markets for tin plates the city of Baltimore, Md., has been chosen as a location for several new tin plate mills. The Stickney Iron Co., which has been engaged in the manufacture of charcoal pig iron for many years, is preparing to engage in the tin plate business, and contracts for part of the machinery have been placed. Norton Bros., of Chicago, have purchased the site of the old Abbott Iron Works at Canton, and will build a tin plate plant and a large tin can factory. The tin plate mill is designed to have a capacity for 4,000 to 5,000 boxes per week, and the can factory will be able to turn out 300,000 cans per day. The South Baltimore Rolling Mill Co., which has a partially erected rolling mill at Curtis Bay, a few miles south of the city, is also considering the alteration of the plant for the purpose of manufacturing tin plates. There are already two tin plate plants in operation in Baltimore—the works of the Baltimore Iron, Steel & Tinplate Co., at Locust Point, and of Matthai, Ingram & Co.—[Bulletin.

Home-Seekers Excursions South and Southeast via Pennsylvania Lines.

Special low rate excursion tickets with twenty day return limit will be sold March 5th, April 2d and 30th, from ticket stations on the Pennsylvania Lines to points in Alabama, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee and Virginia. For details, apply to nearest Pennsylvania Line Ticket Agent, or address F. Van Dusen, Chief Assistant General Passenger Agent.

THE Harvey Steel Co., of Newark, N. J., has brought suit in U. S. Circuit Court against the Bethlehem Iron Co. It is related in the petition that Hayward Harvey, of Orange, N. J., is the inventor of patented improvements in the process for treating steel, in hardening armor plate, etc., and obtained patents therefor, which he assigned to the plaintiff company. The Bethlehem Iron Co., it is complained, has entered into a contract with the Government of Russia to make armor plates, treated with the Harvey process, without holding a license from the complainant. The court is asked to restrain the defendant from carrying out its contract.

THE rolling mill of the Boston Iron & Steel Works, McKeesport, Pa., closed for several months, has started up with 300 men.



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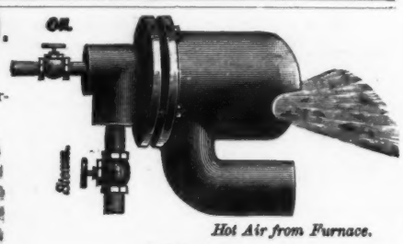

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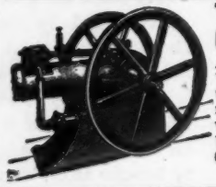

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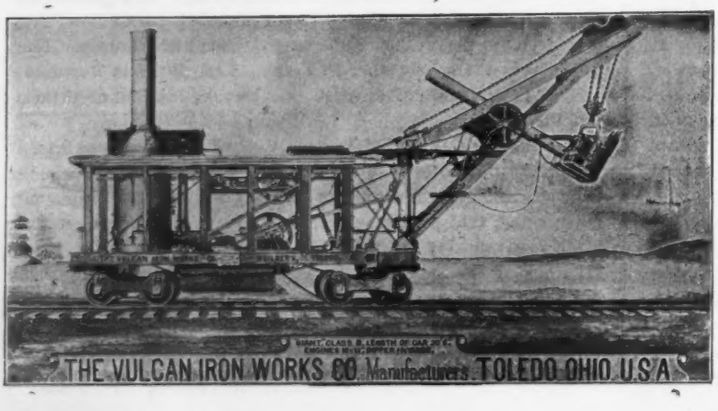

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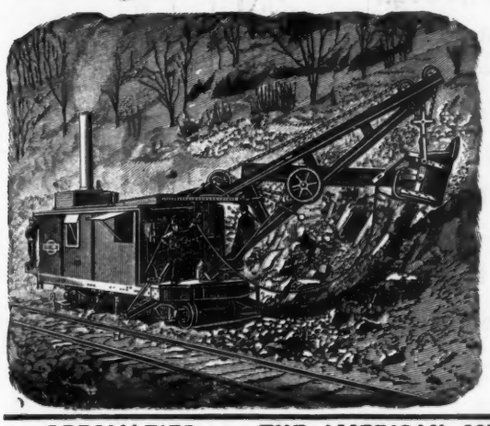

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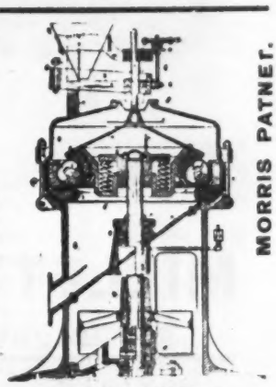

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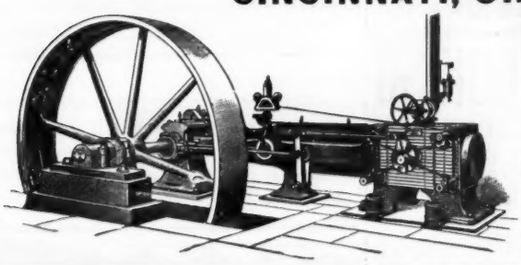

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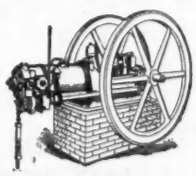

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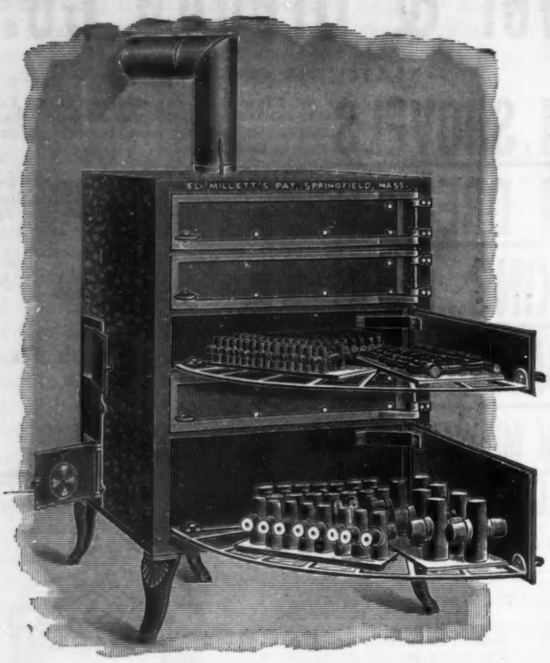

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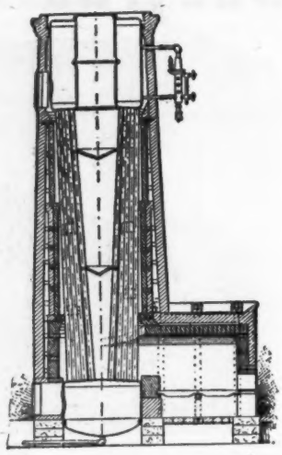

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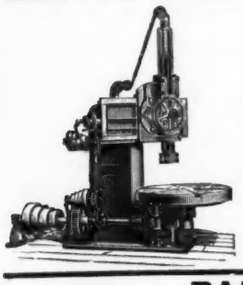

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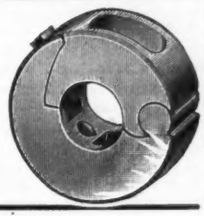

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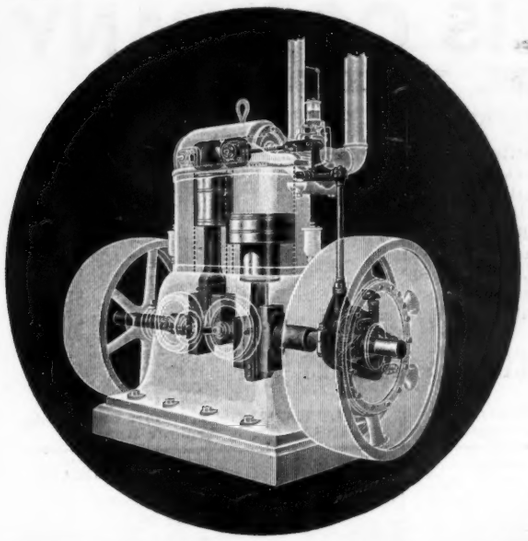

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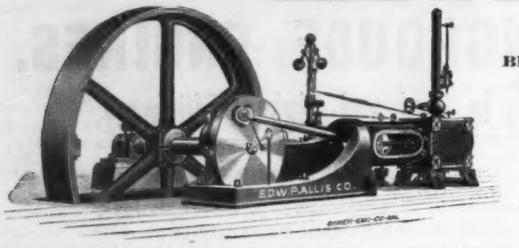

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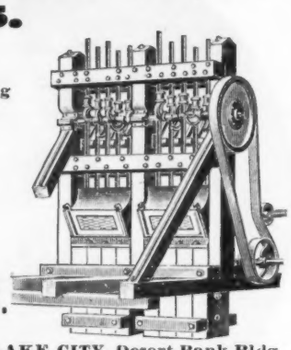

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Wheeler Boiler Co	26

FOR SALE, CHEAP.

A well equipped **Machine Shop** in a flourishing town near Chicago. Shop, 80x200 feet; about three acres of ground; side track; electric light; heated by Sturtevant system of hot air. If wanted, will include full line of Steam Pump patterns, drawings, etc. Address,

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Chicago Heights Land Association
M. H. KILGALLEN, Gen'l Mgr. CHICAGO

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IRON AND STEEL MARKETS.

IRON ORE.

[On Lake Erie docks.]

No. 1 Specular, Bessemer	3.00@ 3.35
No. 1 Bessemer hematite	2.75@ 3.00
Hematites No. 1 non-Bessemer	2.00@ 2.50
No 1. Specular, non-Bessemer	2.35@ 3.00

PIG IRON.

CLEVELAND (f. o. b. cars):	
Bessemer	$10 00@$10 25
No. 1 Strong Foundry	10 75@ 11 00
No. 2 Strong Foundry	9 75@ 10 00
No. 1 Gray Forge, red short	9 10@ 9 25
No. 2 Gray Forge, neutral	9 00@ 00 00
No. 1 American Scotch	11 00@ 00 00
No. 2 American Scotch	10 00@ 00 00
Lake Superior Charcoal	13 00@ 13 50
PITTSBURG:	
No. 1 Foundry	$11 25@$11 75
No. 2 Foundry	10 25@ 10 75
Gray Forge	9 10@ 9 25
White and Mottled	9 00@ 0 00
Warm Blast Charcoal	17 00@ 18 00
Cold Blast Charcoal	22 00@ 26 00
Bessemer	10 10@ 10 25
CHICAGO (reported by our representative:)	
Lake Superior Charcoal	$13 00@$13 50
Local Coke Foundry No. 1	10 25@ 10 50
Local Coke Foundry No. 2	9 75@ 10 00
Local Coke Foundry No. 3	9 40@ 9 65
Local Scotch Foundry No. 1	10 25@ 10 50
Local Scotch Foundry No. 2	9 75@ 10 00
Local Scotch Foundry No. 3	9 50@ 9 75
Southern Coke No. 1	11 00@ 11 25
Southern Coke No. 2	10 00@ 10 25
Southern Coke No. 3	9 50@ 9 75
Southern No. 1 Soft	10 00@ 10 25
Southern No. 2 Soft	9 75@ 10 00
Southern Silveries No. 1	11 50@ 11 75
Southern Silveries No. 2	11 25@ 11 50
Jackson Co. Silveries	15 00@ 16 00
Ohio Silveries No. 1	14 00@ 14 50
Ohio Silveries No. 2	13 00@ 13 50
Ohio Strong Softeners	12 50@ 13 00
Alabama Car Wheel	17 50@ 18 00
Malleable Bessemer	11 00@ 11 50
Coke Bessemer	11 00@ 11 50
CINCINNATI (reported by Rogers, Brown & Co.)	
Southern Coke No. 1, Foundry	$ 9 50@$10 00
Southern Coke No. 2 and No. 1 Soft	9 00@ 9 25
Hanging Rock Coke, No 1	11 50@ 12 00
Hanging Rock Charcoal No. 1, Fdy	15 00@ 16 50
Tennessee Charcoal No 1	13 00@ 14 00
Jackson County Stone Coal No 1	14 00@ 14 50
Southern Coke, Gray Forge	8 25@ 8 50
" " Mottled	8 00@ 8 25
Standard Alabama Car Wheel	15 00@ 16 00
Tennessee " "	14 50@ 15 00
Lake Superior " "	13 50@ 14 00

OLD RAILS AND SCRAP METAL.

[Prices paid by mills.]

	Gross Tons
Old iron rails	$12 50
Old steel rails	10 00
	Net Tons
No. 1 R. R. wrought scrap	$ 9 00
No. 1 wrought scrap	8 00
No. 1 Machine cast scrap	8 00
Iron axles	14 50
Axle turnings	7 50
Wrought turnings (free from cast)	6 50
Cast borings	5 50
Uncut wrought iron boilers	4 00
Steel boiler plates	8 00
Grate bars	5 50
Pipes and flues (clean)	7 00
Tank iron	7 50
Hoop and band iron	6 00
Sheet iron	5 50
Wrought drillings	6 50
Malleable iron	8 00

STRUCTURAL MATERIAL.

Beams and Channels (Cleveland mill)	1.30c@1.35c
Angles	1.20c@1.25c
Tees	1.35c@1.45c
Universal Plates	1.20c
Sheared Plates	1.30c

MERCHANT IRON AND STEEL.

[List prices out of store.]

Flat Bar.

1½ to 4 by ⅜ to 1 inch	1 10
4½ to 6 by ⅜ to 1 inch	1 15
1¾ to 6 by 1⅛ to 2 inch	1 30
1¼ & 1¾ by ⅜ to ¾ inch	1 15
1 & 1⅛ by ⅜ to ¾ inch	1 20
⅛, ¼, ⅜, by ¼ to ⅜ inch	1 30

Frank P. Cady, Pres. and Supt.
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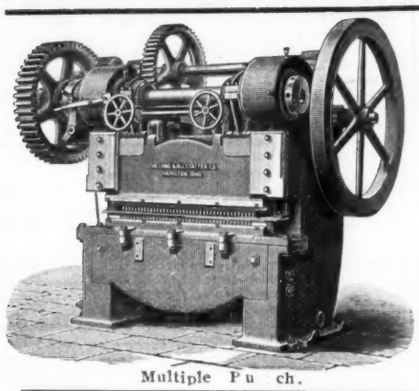
OFFICE, ROOM 510 265 TO 269 DEARBORN STREET, CHICAGO, ILL. WORKS SOUTH CHICAGO.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Manufacturers of Belt, Steam and Electrically driven
Power Punches and Shears,
for all kinds of Boiler, Tank and Structural Iron Work, Rolling Mills, Locomotive Shops, Car and Wagon Shops, Plow Shops, etc. Send for catalogue.

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MANUFACTURERS OF HIGH GRADE **FIRE BRICKS.**
PITTSBURG, PA.
Works and Mines, Westmoreland, Pa

DIXON'S GRAPHITE PAINT
FOR TIN OR SHINCLE ROOFS AND IRON WORK. IT IS ABSOLUTELY WITHOUT AN EQUAL.
Tin roofs well painted have not required repainting for 10 to 15 years.
If you need any paint it will pay you to send for circular.
JOSEPH DIXON CRUCIBLE CO., Jersey City, N. J.

IRON CLAD PAINT CO.
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CLEVELAND, OHIO.
ORDER DIRECT FROM THE
Iron Clad Paint Co.
And get the genuine article, and save liability of suit for using an article made in violation of the patents issued to Wm. Green, and now owned by this Company.
IRON CLAD PAINT is the most durable, most fire-proof and Cheapest Paint made.
FURNISHED both Dry and Ground in Oil
USED BY NEARLY ALL THE RAILROADS.

Subscribe for the Iron Trade Review, $3 per year.

Round and Square.

1 to 1⅞ inch	1 10
2 to 2⅞ inch	1 20
2¾ to 3¼ inch	1 35
3⅜ to 4 inch	1 60
4¼ to 4½ inch	2 20
4¾ to 5 inch	2 40

Oval.

⅜ to 1¼ inch	1 30
⅜ to ¾ inch	1 30
½	1 50
⅝	1 70

Half Oval and Half Round.

1½ to 3 inch	1 65
⅜ to 1¼ inch	1 45
⅜ to ¾ inch	1 70
¼	1 85
⅜	2 95

Heavy Band.

1¼ to 6 by ¼ and 5-16 inch	1 20
1 to 1⅜ by ¼ and 5-16 inch	1 25
¼ to ⅜ by ¼ and 5-16 inch	1 35
½ to ⅝ by ¼ and 5-16 inch	1 60

Hoop Iron.

1 7-16 to 4, No. 13, 14, 15 and 16	1 65
1 7-16 to 2, No. 17, 18 and 19	1 70
1 7-16 to 2, No. 20	1 80
1 7-16 to 2, No. 21	1 90
1 7-16 to 2, No. 22	2 00
1⅛ to 1⅜, No. 13, 14 and 15	1 70
1⅛ to 1⅜, No. 16, 17 and 18	1 75
1⅛ to 1⅜, No 19 and 20	1 80
1⅛ to 1⅜, No. 21	1 90
1⅛ to 1⅜, No. 22	2 00
15-16 and 1 inch, No. 13, 14 and 15	1 65
15-16 and 1 inch, No. 16, 17 and 18	1 80
15-16 and 1 inch, No. 19 and 20	1 90
15-16 and 1 inch, No. 21	2 00
15-16 and 1 inch, No. 22	2 10
⅞, No. 13, 14 and 15	1 90
⅞, No. 16, 17 and 18	2 00
⅞, No. 19 and 20	2 10
⅞, No. 21	2 20
⅞, No. 22	2 30
13-16, No. 13, 14 and 15	2 00
13-16, No. 16, 17 and 18	2 10
13-16, No. 19 and 20	2 20
13-16, No. 21	2 30
13-16, No. 22	2 40
¾, No. 13, 14 and 15	2 10
¾, No. 16, 17 and 18	2 25
¾, No. 19 and 20	2 35
¾, No. 21	2 45
¾, No. 22	2 55
11-16, No. 13, 14 and 15	2 35
11-16, No. 16, 17 and 18	2 40
11-16, No. 19 and 20	2 50
1-16, No. 21	2 60
11-16, No. 22	2 70
11-16, No. 23	2 80
⅝, No. 13, 14 and 15	2 40
⅝, No. 16, 17 and 18	2 50
⅝, No. 19 and 20	2 60
⅝, No. 21	2 70
⅝, No. 22	2 80
⅝, No. 23	2 90
9-16, No. 13, 14 and 15	2 60
9-16, No. 16, 17 and 18	2 70
9-16, No. and 20	2 80
9-16, No. 21	2 90
9-16, No. 22	3 00
9-16, No. 23	3 10
7-16 and ½ inch, No. 13, 14 and 15	2 80
7-16 and ½ inch, No. 16, 17 and 18	2 90
7-16 and ½ inch, No. 19 and 20	3 00
7-16 and ½ inch, No. 21	3 10
7-16 and ½ inch, No. 22	3 20
7-16 and ½ inch, No. 23	3 30
⅜, No. 13, 14 and 15	3 30
⅜, No. 16, 17 and 18	3 40
⅜, No. 19 and 20	3 50
⅜, No. 21	4 80
⅜, No. 22	3 90
⅜, No. 23	4 05

Light Band.

1⅛ to 6 by ⅛ to 3-16 inch	1 40
1⅛ to 6 by Nos. 11 and 12	1 45
1 to 1⅜ by ⅛ to 3-16 inch	1 45
1 to 1⅜ by Nos. 11 and 12	1 50
⅞ and 13-16 by ⅛ to 3-16 inch	1 60
⅞ and 13-16 by Nos. 11 and 12	1 65
¾ and 11-16 by ⅛ to 3-16 inch	1 70
¾ and 11-16 by Nos. 11 and 12	1 75
⅝ and 9-16 by ⅛ to 3-16 inch	1 85
⅝ and 9-16 by Nos. 11 and 12	1 90
½ by ⅜ to 3-16 inch	2 00
¼ by Nos. 11 and 12	2 05

Wagon Box Iron.

⅞ inch, beveled edge, by Nos. 11 and 12	1 60
⅞ inch, " " " " 13 and 14	1 70
¾ inch, " " " " 11 and 12	1 75
¾ inch, " " " " 13 and 14	1 05

Sheet Iron.

No. 10	1 65
No. 12	1 75
No. 14	1 80
No. 15-17	1 90
No. 18	2 65
No. 20	2 20
No. 22-24	2 30
No. 25-26	2 40
No. 27	2 50

Steel Boiler Plates—1-4 in. and Heavier.

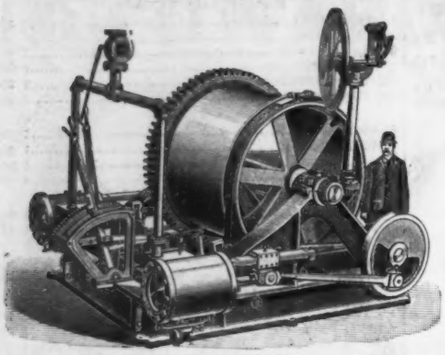
Tank	1 50
Shell	1 70
Flange	1 80
Marine Flange	2 10
Fire Box	3 00

Above includes plates 90 inches wide.

90 to 96 in. wide	½c. lb. extra
96 to 100 in. wide	1 c. "
100 to 104 in. wide	1½c. "
104 to 106 in. wide	special

American Cast Tool Steel.

ROUND, SQUARE AND OCTAGON.	cts. lbs.
1 to 2 in. inclusive	08
9-16 to ⅞ in. "	08⅓



HOISTING MACHINERY for Mining, Quarrying, Coal Handling, Pile Driving, Bridge Building, Log Hauling and for general Contractors' Use. Improved Electric Hoists, single and double Patent Friction Drum, compound, geared with brakes and reversible for general Hoisting, Mining Purposes and Suspension Cable Ways.

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HOISTING AND CONVEYING MACHINERY

For moving all kinds of material in Steam Power Stations, Factories, Gas Works, Mines, Coal Yards, etc.

Tip Cars, Wire Rope, Barrows, INDUSTRIAL RAILWAYS.

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Progression is the order of the day.

Attach one of "LUNKENHEIMER'S" to your boiler and you will be astonished with results. The **only injector** made that will entirely free your boiler of scales.

Practical in Construction; Simple in Operation.

Provided with a visible feed. Sizes ½ pint to 1 gallon. **Specify and insist** on "LUNKENHEIMER'S" and you will get the best. Consult Dealer. New Catalogue of Superior Steam Specialties, gratis upon request.

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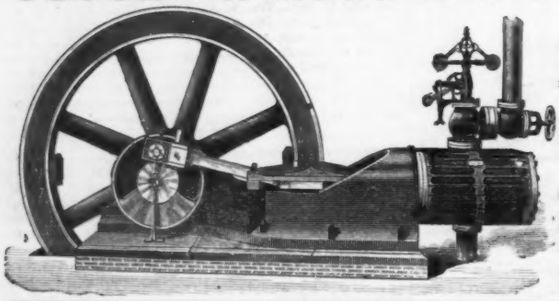
EUROPEAN STORE, THE LUNKEN VALVE CO. 35 & 37 DOVER ST. LONDON, S. E.

TOTTEN & HOGG I. & S. F'DRY CO.



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The Most Satisfactory Fire Brick That Money can Buy

Our well known brands

"O. K." Crown, "O. K." and "A"

They have no equal when used for the purpose designated. They are **good, honest, well made** Brick, **made** to hold **your** trade.

"Our Prices Are Just Right."

Oak Hill Fire Brick & Coal Co.,
Manufacturers,
OAK HILL, OHIO.

7-16 to ⅜ and 2⅜ to 3 in.	09
3⅛ to 4 in.	09½
⅜ to 11-16 and 4⅛	10
⅛ to 6 in.	10½
¼ to 9-32 and 6¼ to 7 in.	11
16 i n	13

Flats.

3	cts. ℔s.
2 to 9-16 in. wide by 2 to ⅝ thick	8

Bessemer and O. H. Steel.

Machinery	base price,	1 50
Tire	"	1 60
Spring	"	2 10
Sleigh Shoe	"	2 00
Toe Calk	"	2 05
Cutter Shoes, tapered and bent	"	2 10

English Tool Steel.

Jessop's	15½c
Hobson's "Best"	15½c
" "Choice"	35c

Burden Boiler Rivets.

½, ⅝, 11-16 and ¾ inches diameter	3 30
Bridge ½, ⅝, 11-16 and ¾ inch diam	3 00

MACHINERY SUPPLY MARKET.

Anvils.

American	℔ 9@10
Wright's	℔ 12

Bellows.

Blacksmiths'	Hill's	dis 40
	Bullock's	dis 50&10
Moulders'		dis 40@40&10
Hand		dis 40&10@50

Belting.

Boston Belting Co.'s standard	dis 70
" " " extra	dis 60&5
" " " best	dis 55
Cleveland Rubber Co. extra standard	dis 60&10
Hoyt's Short Lap	dis 45
Shultz Raw Hide Leather Belting, single	dis 40
Munson's Short Lap Single Leather	dis 50
Munson's Short Lap Double and Light Double Leather	dis 50&10
Shultz Raw Hide Leather Belting, Double and Light Double	dis 4(
Standard, oak tanned	dis 50&1(
Alexander Brothers' pure oak tanned	dis

Blowers and Exhausters.

B. F. Sturtevant's	dis 20
Boston Blower Co.,	dis 35
Buffalo	dis 40

Chucks.

Cushman's 4 Jaw Independent	dis 45
" Combination	dis 40
" Geared Scroll	dis 30
" 2 Jaw Brass Workers	dis 30
" Drill	dis 35
Wescott's Scroll Combination	dis 33⅓
" Independent	dis 40
" Little Giant Drill	dis35
Horton's Universal	dis40
" Independent	dis 45
Whiton's Independent	dis 45
National Combination	dis 40
Sweetland "	dis 40
Almond Drill	dis 20
Morse "	dis 15
Skinner's Combination Lathe	dis 40&10
" Independent Lathe	dis 40&10
" Universal Lathe	dis 40&10
" Drill	dis 20

Cutters and Reamers.

Cleveland	dis 10@15
Pratt & Whitney	dis 10@15
Standard	dis 10@15
Morse	dis 15
Brown & Sharpe, Milling Cutters	dis 15
" " Gear Cutters	dis 15

Crowbars.

Cast Steel	℔ 3½
Iron, steel points	℔ lb 3

Drill and Drill Sockets.

Twist Drills	dis 50&10
Morse Taper and Straight Shank to 1½"	dis 50&10
Morse Taper and Straight Shank Larger than 1½"	dis 25
Drill Sockets	dis 25
Standard Twist Drills	dis 55@55&5
Cleveland " "	dis 55@55&5

Emery.

	No. 4 to No. 46 gr.	No. 54 to 150 gr.	Flour, F. FF.
Kegs, ℔	4½c	5 c	2½c
½ kegs ℔	4¾c	5¼c	2¾c
¼ kegs ℔	5 c	5½c	3 c
10 ℔ cans, 10 in case	6 c	6½c	5 c
10 ℔ cans less than 10	10 c	10 c	7½c

Emery Cloth and Paper.

Barder, Adamson & Co.	dis 50@50&5
H. H. Barton	dis 50@50&5

Emery Wheels.

Detroit	dis 60@70
Norton's	dis 60@70
Grant	dis 60@70
Sterling	dis 6c@70
Celluloid	dis 10&33⅓
Northampton	dis 55
Crystal	dis 65@70
Vitrified	dis 6c@70
Vulcanite	dis 60&10
Hamden	dis 60&10@70
Cyclone	dis 60@60&10

Files.

Arcade	dis 60&10@60&10&10
Nicholson	dis 60&10@60&10&10
" X. F	dis 25
Kearney & Foot	dis 60&10@60&10&10
Black Diamond	dis 60&10@60&10&10
McClellan	dis 60&10@60&10&12
Disston's	dis 65@70

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On your castings that you want removed?

If so,

The ACME CHEMICAL SOLUTION. TRADE MARK. C.C.S.MNF'G.CO. FOR CLEANING METAL CASTINGS & THE SURFACES OF METALS.

Will clean them better than any other method.

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TICKET OFFICES at Station, Euclid Av., Woodland Av., and Weddell House corner.

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* Daily. † Daily, except Sunday.

FROM CLEVELAND TO	LEAVE	ARRIVE
Pittsburgh and Bellaire	† 7:00 am	†12:10 pm
Salem and Pittsburg	* 8:00 am	* 8:30 pm
Pittsburgh, Bellaire and East	†12:45 pm	† 6:25 pm
Philadelphia and New York	* 1:40 pm	*11:25 am
Baltimore and Washington	* 1:40 pm	*11:25 am
Alliance and Pittsburgh	* 1:40 pm	*11:25 am
Ravenna and Alliance	† 3:25 pm	† 9:50 am
Hudson and Ravenna	* 5:00 pm	* 8:25 am
Philadelphia and New York	*11:10 pm	* 5:25 am
Baltimore and Washington	*11:10 pm	* 5:25 am
Alliance and Pittsburgh	*11:10 pm	* 5:25 am

Mt. Vernon and Pan-Handle Route

FROM CLEVELAND TO	LEAVE	ARRIVE
Xenia and Cincinnati	* 8:40 am	* 5:15 pm
Akron and Columbus	* 8:40 am	*5:15 pm
Akron, Columbus & Zanesville	†12:45 pm	*12:10 pm
Akron and Orrville	† 3:25 pm	† 9.50 am
Columbus and Cincinnati	* 8:00 pm	* 6:55 am

Saturdays the 8:00 pm train will leave at 11:20 pm.

Valley Ry.

Depot foot of So. Water St.
City Office 137 Superior St.

	Arrive.	Depart.
Akron & Canton	*6:30 P M	*7:10 A M
Akron, Canton & Valley Jctn.	*10:10 A M	*3:15 P M
Valley Jctn. & Way Stations	†6:30 P M	†7:10 A M
Akron, Canton & Chicago	*8:00 A M	*6:30 P M
Wooster and Chicago	†2:45 P M	†11:00 A M
Wooster		†6:30 P M
Akron, Canton & Marietta	†2:45 P M	†11:00 A M
Steubenville, Wheeling, Washington, D. C., and Baltimore	†2:45 P M	†11:00 A M

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THE UPSON NUT CO., Manufacturers of Nuts, Washers, Carriage, Machine, Plow, and Elevator Bolts, Coach Screws, etc.

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offers **Free Factory Sites** and other inducements.

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Office and Warerooms, 28 Columbus St.
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THE CONDIT-FULLER CO.,

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Successors to Tuttle, Oglebay & Co.

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IRON ORES,

FROM MARQUETTE, GOGEBIC AND MENOMINEE DISTRICTS.

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If you are thinking of enlarging your mill, foundry or machine shop, or of purchasing machinery of any kind, send us a line giving character of machinery needed. We can put you in communication with manufacturers from whom you can buy advantageously.

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OF EVERY DESCRIPTION,

FOR SCREENING PURPOSES.

PERFORATED SHEET METALS OF EVERY DESCRIPTION. THE HENDRICK MANUFACTURING CO. LIMITED. CARBONDALE, PENNA.

THE HENDRICK MFG. CO., Ltd.,

CARBONDALE, PA.

Western	dis 70
Stub's	dis 25
Grobet's	dis 30
Reynolds Bros.' Hand Cut	dis 50
Industry File Works Hand Cut	dis 50

Hammers.

P. S. W	dis 40
Atha new list, Jan. 15, 1887	dis 50
Heavy hammers and sledges under 5 lbs	12c
" " " " over 5 lbs	10c

Jack Screws.

Illinois Bolt Co. list	dis 75

Nuts and Washers.

Size of bolt inches	¼	5-16	⅜	½	⅝	¾	1
Square	8	7	5½	4½	4	3½	3¼
Hexagon	15½	11½	8½	6	5¼	5¼	
Washers	9	8	7	5	4½	4½	4½

In lots less than 100 lbs, ℔ lb add ½c., 1 lb boxes add 1c to list.

Nails (wire).

List July 14, 1887	dis 85
Standard Penny Nails, ℔ keg card rate	
Car lots	$1.05
Less than car lots	$1.15

Oilers.

Zinc and Tin	dis 60
Brass and Copper	dis 50
Malleable (Hammer's), No. 1, $3.60; No. 2, $4.00; No. 3, $4.40 ℔ doz	dis 10@10&10

Picks.

Railroads, 5 to 6 lbs	$12 dis 60
" 6 to 7 lbs	$13 dis 60

Pulleys.

Iron Pulleys, Walker List	dis 50
Medart Pulleys	dis 50
Split Wood Pulleys	dis 55@60

Rivets.

Iron, Thousand, list November 1, 1894	dis 60@65
Iron, Ordinary, Cooper's Block and Carriage list November 1, 1894	dis 60@65
Copper	dis 50@50&10

Taps.

Cards, Hand and Nut to 2 in	dis 50
Carpenters' " " "	dis 50
Morse " " "	dis 50
Pratt & Whitney " " new list	dis 10
Machine Screw Taps	dis 55
Pipe Taps to 2½ in	dis 70
Stay Bolt Taps	dis 25
Stove Bolt Taps	dis 55
Pulley Taps	dis 40

Vises.

Solid Box	dis 60
Parker's	dis 20@25
Prentiss	dis 20
Stephen's	dis 25@30
Barrett's	dis 30
Miller's Falls	dis 40
Merrill's	dis 15@20
Howard	dis 35

Wire.

New List, Apr. 9, 1894

Brass	dis 40
Copper	dis 40
Bright and annealed, Nos. 0@18	dis 70&10@75
" " Nos. 19@26	dis 75@75& 5
" " Nos. 27@36	dis 75&10& 5
Coppered Nos. 0 to 18, market list	dis 70@70& 5
Galvanized Nos. 0 to 18 " "	dis65& 5
Tinned market Nos. 0 to 18	dis 57½
Cast steel	dis 50
Tinned Broom Wire	dis 70&5@70&10
Annealed Fence, Nos. 8 and 9	dis 75
Annealed Grape, Nos. 10 to 14	dis 75
Stub's Steel Wire regular	95c ℔ lb dis 30

Wrenches.

Coe's genuine	dis 50
Girard Standard	dis 70&10
Agricultural	dis 75&10
Mechanic's	dis 55&10& 5
Bemis & Call's Combination	dis 35
Donohue's Engineers	dis 20&10
Lamson & Sessions Engineers	dis 60
Billings & Spencer's Drop Forged	dis 25
William's " "	dis 25
Alligator " "	dis 40

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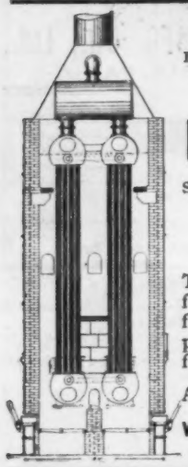

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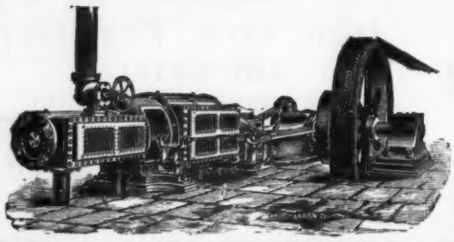

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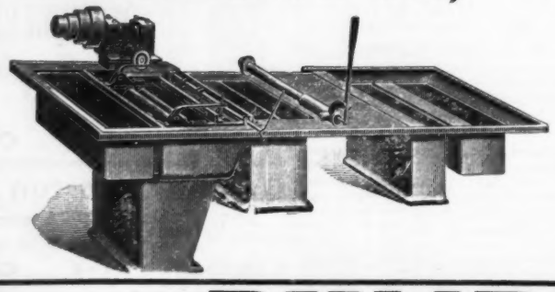

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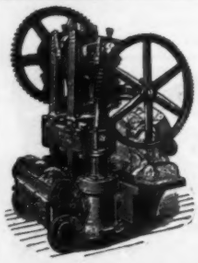

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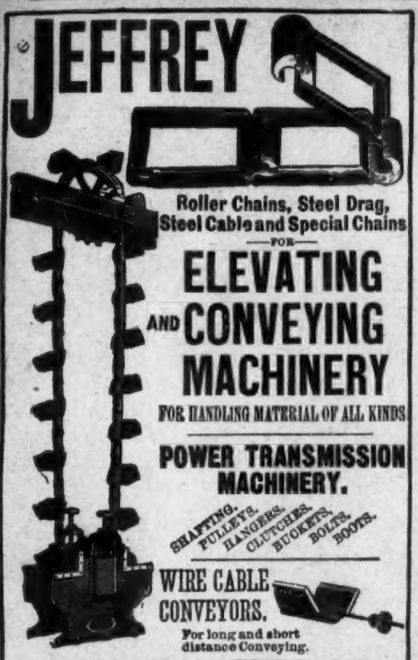

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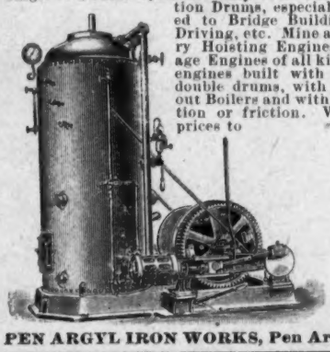

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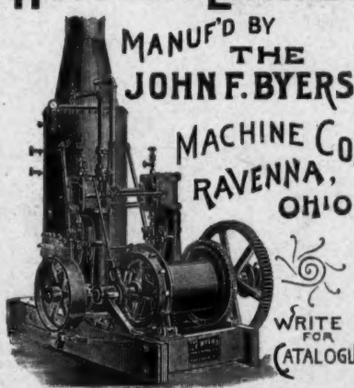

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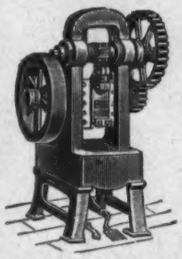

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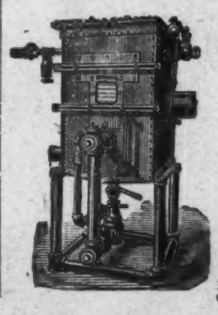

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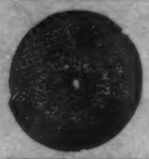

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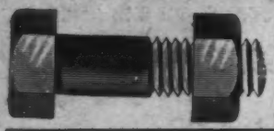

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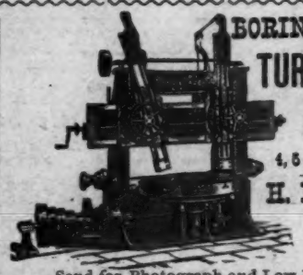

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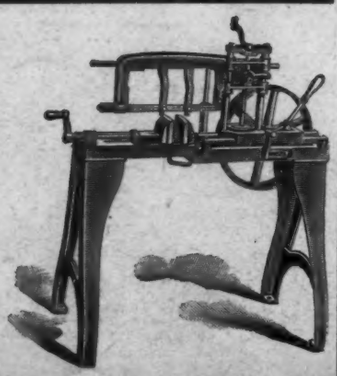

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